THE
METAL INDUSTRY
WITH WHICH ARE INCORPORATED
THE ALUMINUM WORLD: COPPER AND BRASS: THE BRASS FOUNDER AND FINISHER
ELECTRO-PLATERS REVIEW

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The History and Development of the Bridgeport Brass Company

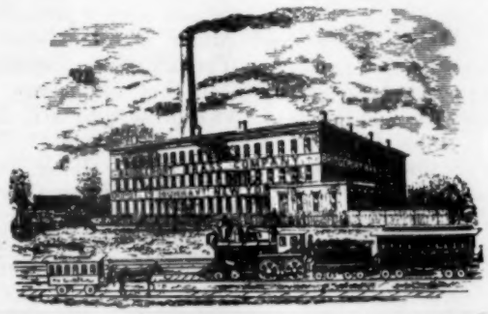
The Story of One of New England's Early Brass Rolling Mills, Now Sixty Years Old.

Written for The Metal Industry by A. D. GUION, Bridgeport Brass Company, Bridgeport, Conn.

BRIDGEPORT BRASS COMPANY'S SIXTIETH BIRTHDAY

On November 2, 1925, the Bridgeport Brass Company will have rounded out sixty years of service as makers of brass.

To have lived during sixty eventful years of American industrial life is much. To have progressed throughout the full sixty years is more. For the true test of an institution is more than its age. It is how much the institution has written into the progress of the world and how its achievements have contributed to the well-being of those it has always attempted to serve. Judged by this standard, the Bridgeport Brass Company has richly justified its existence, and while profiting by the experience of each passing year it has yet retained the spirit of youth and progressiveness which has characterized the company's activities from the beginning.



PLANT OF THE BRIDGEPORT BRASS COMPANY AS IT APPEARED IN 1865, THE YEAR IT OPENED

To paint the picture of this corporate personality it is fitting to go back to the humble beginning and trace, step by step, the achievements that have brought it to its present honored place among the industries of Connecticut.

To the simple recounting of these high points in the company's history, the following pages are devoted.

THE IMPORTANCE OF BRASS

Sixty years ago brass was widely and favorably known. Its place in the industrial scheme, as industry existed at that time, was definitely appreciated. Since then the electric light, the trolley, the telephone, the phonograph, the automobile, and the radio have made increasing demands upon this adaptable metal. So naturally has this increase come about that we have accepted brass in relation to these things as a matter of course.

Picture the world today without brass. Imagine the loss of time and money, the destruction by rust, the discomfort—even the danger that would inevitably follow. It would be almost like stepping back into the middle ages.

Brass in its manifold uses is an essential part of countless factors entering into our daily contacts. Upon the integrity and skill of its manufacture depends the successful conduct of practically all of our daily life.

Beginning with an uncertain mixture of copper and zinc, each year has marked an advance in the control of its manufacture so that today literally thousands of combinations of these two basic components with other alloys serve countless needs to a nicety.

The transformation of the crude metal into a million finished products seems like magic when the intricacies of manufacturing operations are studied. That brass can be drawn, stamped, forged, pressed, moulded, machined, cast, spun, punched, soldered, welded, ground, hardened, rolled thin as tissue paper, stretched, polished, finished in a thousand ways and that it will withstand the elements for thousands of years, seems almost incredible. No wonder the alchemists of the Middle Ages adopted as the distinguishing mark of its main element the Egyptian symbol of everlasting life.

A NECESSITY IN INDUSTRY

There is scarcely an industry that does not use brass in some form. In the field of transportation the mighty ship, the automobile, the trolley, the train, the aeroplane, all depend upon this faithful metal for their proper functioning. Music, (brass band, piano and phonograph), building (plumbing, hardware, lighting fixtures), textile mills, paper mills, rubber mills, food-stuffs, wherever men work, whether with the delicate hand of the surgeon or the mighty engines of war, brass in a thousand forms is their help and often their mainstay.

In the home, the hospital, the church, the office, in our business, our recreation, in peace, in war, ministering to our comfort in heat, in cold, in danger from fire, safeguarding our health, in youth and old age, the list of everyday uses is practically endless and emphasizes the fact that from the cradle to the grave brass is with us.

Wherever we go it goes with us and wherever we are we find it at work for us in some form or other.

Brass has ever been the handmaiden of the electrical industry and has kept steady pace with its rapid advance. The Bridgeport Brass Company has been closely identified with electricity's various manifestations. When the incandescent lamp replaced the kerosene burning oil lamp, Bridgeport's "New Rochester" lamp was superseded by the brass socket shell, as an important item of manufacture. The Bridgeport Brass Company was the first to install and successfully operate electric furnaces for melting brass—the first radical improvements of the sort in 140 years of brass melting. The principal flash-light concerns, many radio part manufacturers, every prominent trolley line and electrified steam railroad employing overhead electrification, uses some kind of "Bridgeport" products.

BEGINNING OF THE COMPANY

The year 1865 was an eventful one in the country's history. The great Civil War had ended. Lee had surrendered to Grant at Appomattox Court House. The nation mourned the death of the great Emancipator. Bridgeport was a town of some 17,000 population. Its most prominent citizen, Phineas T. Barnum, had already attained wide fame through the conduct of his museum and the introduction of Jenny Lind to the music loving American public. He spared no opportunity to boost his home town, and Bridgeport, through his efforts, was widely advertised. Among those who were induced to consider Bridgeport as their business home were three Brooklyn manufacturers, D. W. Kissam, John Davol and S. R. Wilmot. On November 2, 1865, they incorporated the Bridgeport Brass Company, with Mr. Davol as president, Mr. Wilmot, treasurer and Mr. Kissam, secretary.

In February, 1875, Mr. Samuel R. Wilmot was elected president. It is interesting to note that in this year the Bridgeport Brass Company decided to go out of the brass clock movement business and the equipment used to make these parts was sold to the Ansonia Brass & Copper Company. Part of the arrangement was that the Bridgeport Brass Company would be guaranteed a customer or customers for clock brass in quantities of 3,000 pounds per month.

In March, 1877, Mr. Wilmot resigned as president and Mr. John Davol was again elected to this office, which he held for about a year when he was forced to retire because of ill health. His son, W. H. Davol, then became president. In August, 1880, W. H. Davol was succeeded by Frederick A. Mason. In the early part of 1881 Mr. Mason became vice-president and treasurer and Mr. C. M. Mitchell was elected president. Mr. Mason managed the company until illness forced him to retire in April, 1890. Mr. C. A. Hamilton was then appointed treasurer and Mr. Kissam continued to be secretary for four more years, when he refused re-election in 1894, after having been secretary since the organization—a period of 28 years.

Mr. Nelson M. Beach succeeded Mr. Kissam as secretary. In January, 1895, Mr. F. J. Kingsbury, Jr., became secretary, Mr. Beach having been made treasurer and manager. Mr. C. M. Mitchell died in March, 1899, and Mr. George E. Somers, who had been general superintendent for many years, was made president. Mr. F. J. Kingsbury, Sr., became vice-president. In March, 1902, Mr. Nelson Beach died and the office of treasurer and general manager was filled by Mr. F. J. Kingsbury, Jr. In 1905 he was elected president. Also during this year Mr. G. P. Miller was appointed assistant secretary and treasurer. The executive personnel as of November, 1919, was: Mr. F. J. Kingsbury, Jr., president; Mr. W. R. Webster, vice-president; Mr. G. P. Miller, treasurer and general manager; Mr. R. I. Neithercut, secretary.

Since the latter part of 1921 the executives of the Bridgeport Brass Company have been as follows: Mr. F. J. Kingsbury, chairman of the board of directors; Mr. Carl F. Dietz, president and general manager; Mr. W. R. Webster, vice-president; Mr. R. I. Neithercut, secretary;

THE ENTIRE OFFICE FORCE OF BRIDGEPORT BRASS COMPANY CONSISTED OF THESE SEVEN MEN IN THE LATE 80'S

Mr. F. J. Kingsbury, treasurer; Mr. W. R. Clark, general works manager; Mr. Warren D. Blatz, general sales manager.

Mr. Carl F. Dietz was educated at Stevens Institute of Technology, class of 1901, and the Royal Technical College, Berlin, where he spent some time in post-graduate work. After several years of blast furnace and steel mill work he became assistant superintendent of the Lungwitz Reduction Company, engaged in zinc metallurgy in 1905, and later with Dyke Keedy, formed the firm of Dietz & Keedy, Boston, which engaged in the development and operation of mills for the treatment of complex ores, examination of mining properties and acted as technical advisors and engineers. For upward of a year Mr. Dietz was staff engineer with Minerals Separation, Ltd., London.

In December, 1911, he joined the Norton Company, Worcester, Mass., as plant engineer. In 1915 he became sales manager. In 1919 he was named vice-president and general sales manager, and in September, 1921, be became president and general manager of the Bridgeport Brass Company.

Mr. William R. Webster was educated at Cornell University, class of 1890. For two years thereafter he was associated with Westinghouse, Church, Kerr & Company. In 1892 he was employed by the Aluminum Brass & Bronze Company, which afterwards became the Housatonic branch of the Bridgeport Brass Company. During the depression of 1893 Mr. Webster became superintendent of the Bridgeport Copper Company, one of the pioneer producers in this country of electrolytically refined copper, which position he held until 1897, when the entered the employ of the Bridgeport Brass Company as foreman of its rolling mill.

Gradually, through his ability and broad knowledge of the brass industry, he became successively superintendent of the raw material department, general superintendent, and in 1914, vice-president, which position he now holds. He is also president of the Automatic Machine Company, vice-president of the American Tube & Stamping Company, and treasurer of the Connecticut Steel Corporation.

HOOP SKIRT DAYS

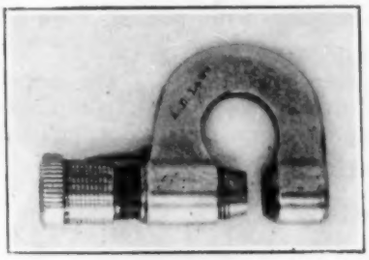
The ladies that "all turned out" in the days when Johnny came marching home wore hoop skirts. Some of the hoops were of rattan, some of whale bone, but the most modern and fashionable were of flat steel strips, fastened with brass where the ends joined. "Spangles" of brass were used to fasten the cloth below the rows of hoops to the metal skeleton forming the hoop skirts, and thus it happened that the little brass company which made its formal bow in the same year that Lee surrendered to Grant at the Appomattox Court House, numbered among its first products brass parts for ladies' gowns of that stirring period. During the 60 years that have since passed Dame Fashion has made many demands upon the Bridgeport Brass Company. Today Warner Bros. Company of Bridgeport and the Koh-i-noor Dress Fastener Company of Long Island City, to mention but two prominent dress accessory manufacturers, use "Bridgeport Brass" in their products.

It is interesting to note that when hoop skirts went out of fashion, one enterprising manufacturer of steel strips conceived the idea of using his product in the manufacturing of measuring tapes and the present steel tape is the result.

FIRST AMERICAN MICROMETER

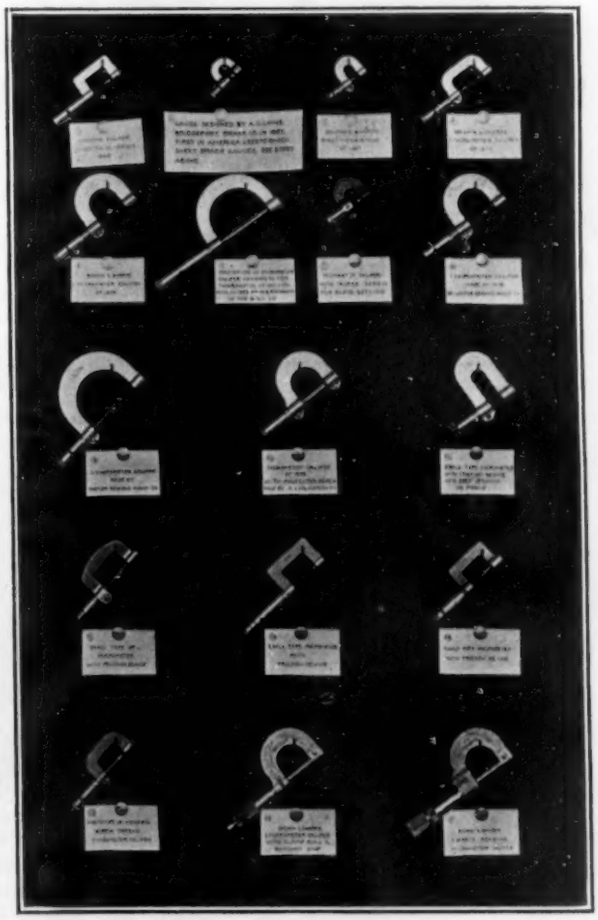
The old saw, "Necessity is the mother of invention," finds a notable example in the case of the micrometer—which is used so universally today for measuring the diameter or thickness of metal.

History relates that in 1869 the Union Metallic Cartridge Company returned a lot of sheet basss to the Bridgeport Brass Company because it was "out of gauge." When checked with the manufacturer's measuring instruments, the thickness was found to be correct. It was discovered, however, that the gauge used by the customer did not agree with that of the manufacturer and further, when both gauges were tested by a third, no two of them agreed, although they were supposed to be the regular U. S. standard adopted by the wire manufacturers in 1857.



AMERICA'S FIRST MICROMETER ORIGINATED IN THE SHOP OF BRIDGEPORT BRASS COMPANY

S. R. Wilmot, at that time Superintendent of the Bridgeport Brass Company, to prevent a recurrence, had six measuring instruments made in accordance with his idea, under the direction of A. D. Laws, who was then in charge of the Mechanical Department. Early in 1867 Brown and Sharpe were approached with the view of having them make the gauges. While certain features of the tool made its reading difficult, it did establish the form of the present micrometer and thus became the first link in the chain of these essential measuring instruments.



THE EVOLUTION OF THE MICROMETER IS ILLUSTRATED HERE, FROM THE ONE SHOWN ABOVE DOWN TO THE DIRECT INDICATING MODEL SHOWN IN THE LOWER RIGHT HAND CORNER OF THIS CUT.

Some years previous to this, a Frenchman named

Palmer had perfected a "screw caliper" which was on exhibit at the Paris Exposition in 1867 and when seen by Joseph R. Brown and Lucian Sharpe, it was recognized to have possibilities, and one of these instruments was brought back to America. The Bridgeport instrument set the type for the well known semi-circular caliper, while the Palmer instrument set the standard method of reading.

Through the courtesy of Brown and Sharpe the above photograph was taken showing the development of the micrometer from its earliest days to the present.

GRANDDADDY OF THE ELECTRIC FAN

Another veteran product was Lambeth's Patent Improved Fly Fan revolving by clock work which was popular long before the practice of fighting flies and mos-

AN EARLY PRODUCT OF THE BRIDGEPORT BRASS COMPANY WAS THIS FLY FAN, WHICH FOUND FAVOR AT BEDSIDE, CRIBSIDE AND RINGSIDE

quitoes by means of revolving fans in butcher shops was in vogue, not to mention the more recent fly swatters and spraying solutions.

It was the first mechanical device of this sort to gain favor for use at bedside, cribside and ringside. The largest demand occurred in the South. It attained quite a sale although it is doubtful how effective it was as a protection from flies. Probably the size of the large cloth covered wings and the motion of the shadow they cast frightened the flies of yesterday. It is unbelievable the small air currents thus created had any part in blowing them away. A traveler returning from India a few years ago related having seen one of these fans still doing service in a restaurant in Bombay.

ONE OF BRIDGEPORT BRASS COMPANY'S EARLIEST ADVERTISEMENTS. THIS APPEARED IN IRON AGE 1875 AND EXPLOITS THE FARMER LANTERN

EVOLUTION OF THE CLOCK

The clock is significant, not only of the passing of time which marks the 60th anniversary of the Bridgeport Brass Company's birth, but of the skill in the Company's personnel which has found its outlet in so many valuable contributions to America's well being.

Prior to 1800, clock parts were made of wood. A seven foot hall clock in 1810 cost $20 for the works alone,—a considerable sum in that day. It was then the custom for a clock maker to finish two or three clocks and peddle them on horseback returning to his shop when they were sold, getting for them, of course, all the traffic would bear. These Connecticut peddlers were for the South and West the original "Yankees" and became a recognized institution all through the country. From 1825, when the first brass parts were made, until the Civil War period steady improvement in clock movements were made.

Brass clock parts were made in the Bridgeport Brass Company factory in the early seventies. In 1875 all their clock making machinery was sold to Ansonia Brass & Copper Company.

THE COW'S LANTERN

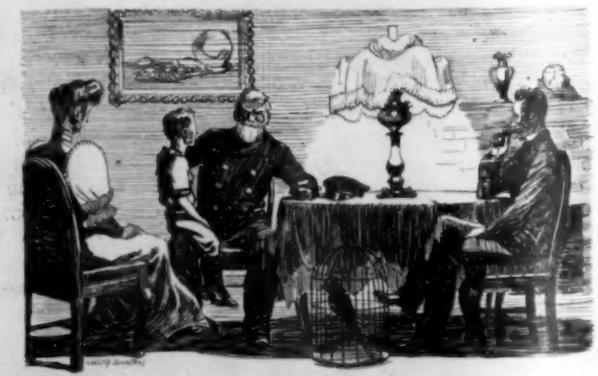
In 1871 Mrs. O'Leary's cow kicked over the lamp which started the great Chicago fire. History has failed to record the make of burner in this famous lamp. Possibly it was a Bridgeport Brass product, for even at this early day the company was making lamp burners and parts.

WHEN HIGHER MEANT FEWER. THESE FIRST 'CYCLES WERE AVAILABLE ONLY TO THE WELL-TO-DO BECAUSE OF THEIR HIGH COST. BEFORE THEY HAD ALL DISAPPEARED IN FAVOR OF THE "SAFETY," MANY WERE EQUIPPED WITH BRIDGEPORT BRASS COMPANY'S "SEARCHLIGHT" BICYCLE LAMP THAT HELD ITS POPULARITY THROUGHOUT THE KEROSENE AND ACETYLENE ERAS

The student lamp was a product of this period. The Leader burner for a flat chimney was developed in the brass shop.

The Lincoln burner popular in the North was very difficult to sell in the South because of the name. This, however, was changed to National and a large Southern business resulted.

In 1875 it was decided to advertise. The Farmer



IN THE DAYS WHEN "COAL OIL" CAME TO CHEER OUR EVENINGS, THE BRIDGEPORT BRASS COMPANY ENTERED THE FIELD OF ILLUMINATION WITH THE "NEW ROCHESTER" LAMP, THE MOST PRIZED MODEL OF WHICH IS SHOWN HERE. THE BRASS PARTS FOR ELECTRIC LIGHT SOCKETS FORM TO-DAY A LARGE PORTION OF THE COMPANY'S OUTPUT

Lantern was featured as shown in illustration on page 314.

Lard oil and candles were giving place to coal oil and the growing demand for a kerosene burner resulted in a series of improvements over a period of some 15 years, culminating in the acquiring of manufacturing rights of the "New Rochester" lamp which attained a tremendous sale and is readily recalled today by practically every youth and maid over 40 years old.

WHEN THE SAME DIAPHRAGM SERVED AS TRANSMITTER AND RECEIVER. ONE OF AMERICA'S EARLIEST COMMERCIAL TELEPHONES. NOTE HOW LITTLE THE MODERN RECEIVER HAS CHANGED IN SHAPE FROM THIS EARLY PROTOTYPE

With the leadership thus attained it was but natural that when the bicycling craze took the country by storm in the early nineties this company should develop the first successful kerosene burning bicycle lamp, first for the solid wheel "safety" and later for the pneumatic tire bike.

In 1880 Thomas A. Edison gave the incandescent lamp to the world and again Bridgeport's identification with lighting affairs resulted in the development of the brass cap and shell, which when fitted with porcelain interior is known to us all as an electric light socket. Production today runs into several millions a month, and through other prominent Bridgeport concerns who assemble the parts, these eventually find their way into every part of the civilized world.

"HELLO" IN THE EARLY EIGHTIES

In the late '70s the telephone was to a small group of scientifically inclined men what the radio was five years ago. Young men, just out of college, were interested in an amateur way in building telephone circuits from neighboring houses to experiment with this "talking telegraph." One of these young men was a Bridgeporter just graduated from Sheffield, by the name of Charles C. Godfrey. With some others he built a private telephone line, which worked successfully. A bell ringing device and what we now know as a receiver, which then was both receiver and transmitter, was built to order under his supervision. So great an interest was aroused by this amateur attempt that the young men saw in it an opportunity to convert it into a commercial proposition and thus the Southport, Fairfield and Bridgeport Telephone Company was started. This ran from Southport to Bridgeport and continued in operation until the Southern New England Telephone Company bought it out.

A number of improvements were made in the details of operation and installation by another young man named Thomas B. Doolittle. Mr. Doolittle for some years had been in the employ of the Bridgeport Brass Company, during which time he became interested in telegraphy. Being also interested in the telephone, he saw immediately the possibilities of replacing the iron wire which was then in use with hard drawn copper, in the making of which he was well versed. An order for this wire was finally placed on May 25, 1883, with Bridgeport Brass Company and under Mr. Doolittle's personal supervision this wire was drawn and strung by the Southern New England Telephone Company for the American Bell Telephone Company in the spring of 1884, for the first long distance telephone line between New York and Boston. The wire proved so successful in operation that its use spread rapidly.

This first installation remained intact for a period of 32 years and when taken down in March, 1916, in practically the same condition in which it was installed, the copper was melted into medals and one each given to members of the Telephone Pioneers of America at a meeting held October 27, at Atlanta, Ga., among whom Bridgeport Brass Company was naturally numbered.

A medal made from a portion of the wire, a section of the wire itself and the original telephones which were used before the Bell Telephone Company was organized are cherished relics in the Company's Museum collection.

TANDEM HONEYMOON DAYS WITH DAISY

In the '90s tandems, bloomers and century runs were the main topics of conversation. Then a man was known by the cyclometer he kept. The bloomer girls were subject to considerable criticism in those old days. By today's standards they were considerably overdressed.

Century runs had sometimes to be completed after sunset and the sales of the Searchlight Bicycle lamp grew apace. It was exhibited at the Chicago World's Fair in 1893.

Previous to the introduction of the solid-tired "safety," lamps burning heavy oil were imported from England. Bridgeport developed the first successful bicycle lamp for "coal oil." With the introduction of pneumatic tires, changes were made to meet the new condition. Still later an acetylene lamp replaced the oil burning device.

A 15,000 MILE RACE AROUND THE CONTINENT

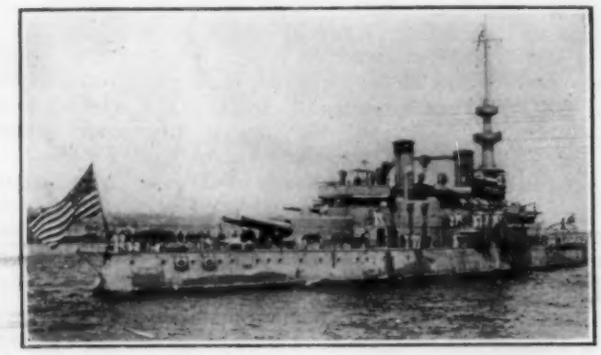
One of the early products of the Bridgeport Brass Company's Tube Mill was Condenser Tubes. At that time their largest use was in marine surface condensers.

A MEDAL MADE FROM THE WIRE THAT FIRST CARRIED THE HUMAN VOICE FROM NEW YORK TO BOSTON, WHICH SAW 32 YEARS OF SERVICE BEFORE BEING TAKEN DOWN. THE WIRE WAS DRAWN BY BRIDGEPORT BRASS COMPANY

Among the ship yard customers was the Union Iron Works of San Francisco, builders of the U. S. Battleship Oregon, in which Bridgeport Condenser Tubes were used.

The destruction of the Maine in Havana Harbor February 15, 1898 led to war with Spain. The battle of Manila Bay had been fought and won and on the other side of the continent the Spanish Admiral Cervera had

entered Santiago Harbor with his fleet. During all this time the "Oregon" had been rushing south from San Francisco to make the long trip around the Horn. Nothing approaching this remarkable voyage had ever been known in the history of battleships. That she should have stood the strain of a race of 14,700 miles without a break shows the sort of material used in her construction by the builders. Bridgeport condenser tubes proved their worth on this memorable voyage and helped to bring the "Oregon" from the Atlantic to the Pacific to fire the first



U.S.S. OREGON, IN SPANISH AMERICAN WAR DAYS WHEN SHE WAS THE PRIDE OF THE U. S. NAVY, MADE 15,000 MILES WITHOUT A STOP IN GETTING FROM THE PACIFIC TO CUBA FOR ACTION, USING BRIDGEPORT CONDENSER TUBES

shot at the Battle of Santiago Harbor and to pursue under forced draft for 48 miles the pride of the Spanish Navy —the one warship that succeeded in running the gauntlet before finally being forced to beach.

With the rise in later years of the big power stations, increasing quantities of condenser tubes were demanded. In 1913 a practical service test was decided upon under circumstances where the tubing would have to meet the worst possible natural conditions and thus prove the correctness of the company's method of manufacture.

The opportunity sought was presented by an inquiry from a southern sea port which described the circulating water as "from the Gulf Stream mixed with the effluent of the storm water drains of the city and some sewage from outlying districts. The water contains some silt and much animal life, including many jelly-fish, floating barnacles, etc., so small that it is not practicable to exclude them. Because of the high temperature, an average between 80° and 82°, and other adverse conditions, the corrosive effect of the circulating water is unusually severe and in other plants of this company Admiralty composition condenser tubes of ordinary quality have failed with the average life of one year or less."

Twelve thousand Bridgeport tubes were installed in 1914, their performance to be carefully observed and recorded.

When in 1922 24,000 more tubes were ordered, the company stated, "The tubes of the condensers now in use in the power plant have already been in service eight years with less than 1 per cent of failures."

The power plants in which Bridgeport Brass Company condenser tubes are installed are as follows: Penn-Ohio Edison Company, Toronto, Ohio; Indiana General Service Company, Marion Station; East Penn Electric Company, Pine Grove Station; Duquesne Light Company, Colfax Station; United Electric Light & Power Company, Sherman Creek Plant; Metropolitan Edison Company, Middletown Plant; Detroit Municipal Plant; Hartford Electric Light Company, South Meadow Station.

A BUSY BUSINESS THAT IS ALWAYS FLAT

For many years prior to 1895 the Bridgeport Brass Company had been closely identified with the printing trades. Printers' rules and block brass were made in large quantities from 1882 to 1895.

During this time also the company did a large business in galley plates which were widely used in the printing trade. These called for manufacturing equipment capable of making a flat metal sheet.

When the phono-engraving process came prominently into use in the early '90s, the Bridgeport Brass Company, being known for its equipment for turning out flat sheets of brass, was approached with the suggestion that perhaps it might be able to furnish the trade with flat copper sheets which would be suitable for engraving purposes. As in all pioneer efforts, at first the road was a rough one and it was soon discovered that ordinary copper would not withstand the processes incident to the production of photo-engravings. It was also discovered that it made a difference which side of the plate was uppermost during the rolling processes. After considerable experimentation the Bridgeport Brass Company developed a satisfactory material, free from surface imperfections and perfectly flat.

Today a large tonnage of Engravers' Copper used in this country and abroad is made in the mills of the Bridgeport Brass Company.

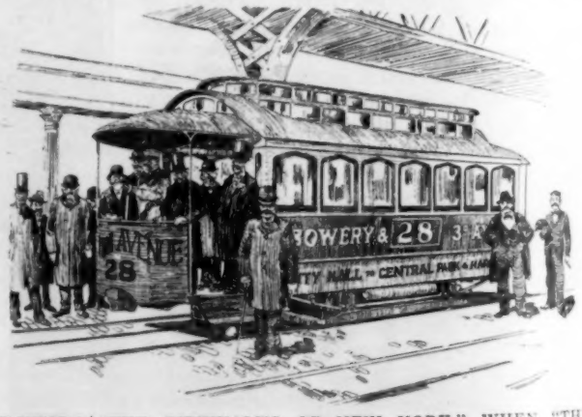
THE BRIEF DAY OF THE TROLLEY

Because of the rapidly increasing use of the motor bus where trolleys formerly have been used, most of us are apt to regard the trolley system as rather an ancient institution. Yet "horse car days" are a distinct memory to all but the mere stripling.

Indeed some of us can recall when the horse car was new. In Bridgeport for instance, the year 1865 which marked the incorporation of the Bridgeport Brass Company, also witnessed the first horse car line in the industrial capital of Connecticut.

Soon after electric operation was started it became evident that for certain sections of large street railways, copper trolley wire did not have satisfactory wearing qualities. The necessity for frequent renewals demanded some material which would provide satisfactory conductivity and at the same time guarantee a considerably longer life. In 1889 Frank J. Sprague, the well known engineer and pioneer builder of railroads employing the overhead trolley method, installed a system in Richmond, Virginia.

Mr. Sprague had a great deal of trouble in securing a satisfactory wire for the overhead contact line as the



BETWEEN "THE SIDEWALKS OF NEW YORK," WHEN "THE INTERESTS" WERE FIRST ENCROACHING ON BOWERY TERRITORY. NEW YORK'S FIRST CABLE CAR, FORERUNNER OF ELECTRIC RAILWAYS TO WHICH BRIDGEPORT BRASS COMPANY HAS SUPPLIED THOUSANDS OF MILES OF PHONO-ELECTRIC TROLLEY WIRE

copper wire available at that time was entirely unsatisfactory.

In some way the difficulties being experienced were brought to the attention of the gentlemen who were at that time organizing the Aluminum Brass and Bronze Company, which occupied the property now covered by the Bridgeport Brass rolling mill at Housatonic avenue.

That company developed a wire for the purpose which was so satisfactory that Mr. Sprague specified it for all of the railways which were thereafter built under his supervision.

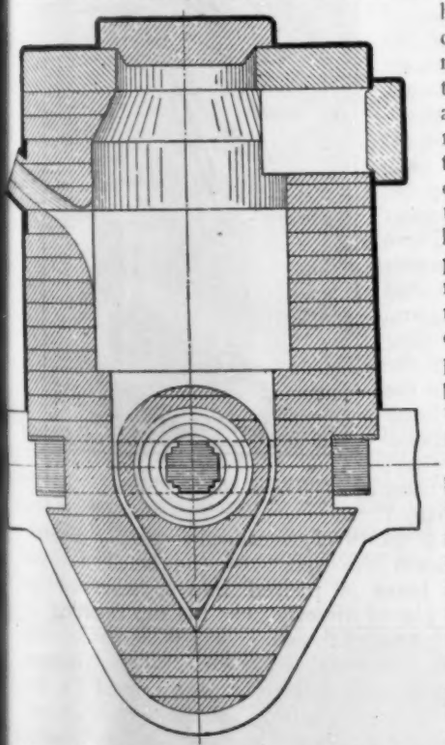
The wire was a combination or alloy wire so designed as to afford a satisfactory combination of conductivity and high tensile strength. Its wearing qualities were from two to four times greater than ordinary hard drawn copper.

The name "Phono-Electric" Wire was given to it because at the time of its development the telephone was becoming more widely known and it was believed that the new wire would fill a need in this field permitting a longer span in erection due to its greater strength. As the result of continued study and experimentation, the quality of the material was from time to time improved.

After heavy traction electrification began in this country and both copper trolley wire and steel trolley wire had proven unsatisfactory, Phono-Electric was selected as the standard contact wire by the New York, New Haven & Hartford Railway Company and then was later adopted by the Norfolk & Western Railway Company, Pennsylvania Railroad and Boston & Maine Lines, which all proceeded with their electrification work within a few years of each other.

A CASTING SHOP WITH NO STACK

There is probably no more wonderful achievement in industrial history than the manner in which the pioneer makers of brass in Connecticut with no knowledge of the business, no machinery, no raw material, nevertheless went out and found their raw materials in the scrap pile—old copper kettles and household utensils, pieces of zinc, roofing and zinc used for various other household purposes — and proceeded to develop the manufacture of brass.



CROSS SECTION OF THE AJAX-WYATT ELECTRIC INDUCTION FURNACE WHICH HAS DONE MORE TO BRING UNIFORMITY INTO MANUFACTURED BRASS THAN ANY OTHER SINGLE FACTOR BY REDUCING TO A MINIMUM THE "HUMAN FACTOR"

Up to 1916 brass was melted in exactly the same way as it was when the industry first started in this country and still is in many brass shops. The brass was melted in a furnace which consisted simply of a square hole in a floor just big enough to hold the crucible, around which sufficient fuel was packed to melt the metal in the crucible. A fire was built at the bottom of this hole in the floor, the crucible put into the fire which was allowed to burn until the contents of the crucible became molten. The crucible was then grasped by a pair of tongs, pulled out of the furnace and the metal poured into a mold.

There are many disadvantages connected with this process. In the first place, it took considerable heat to melt the brass, and the vicinity of a crucible furnace was hot. Furthermore, zinc is very volatile, that is, it fumes out of the brass as soon as it is melted, in the form of zinc oxide, and makes a dirty smoke which constantly pours from the top of the crucible in a large volume when the crucible is taken out of the fire. Consequently, the whole vicinity of the crucible furnace was hot and dirty, and a disagreeable place in which to work. Moreover, the various operations, connected with putting the pot into the fire, the copper and zinc into the pot, taking the pot out of the furnace and pouring the metal into the mold all had to be done in a very precise way in order to make high grade brass.

If the copper was not at the right temperature when the spelter was put into it the brass was not good. If the brass was not the right temperature when the crucible was drawn out of the furnace the brass was not good. If the mixture in the pot was not properly skimmed the brass was not good. If it was not poured into the mold in precisely the proper way the brass was not good.

Now all of these difficult and precise operations had to be done with the crucible process under about the most disagreeable of all industrial conditions. There were probably few places to work that were worse than an old crucible casting shop. It was dirty, hot and everything about it was conducive to poor workmanship. It took men who had extroardinary physique and extraordinary physical endurance to stand the operations at all.

In 1916 W. R. Webster became convinced that this method of melting brass could be improved. He had been closely watching the growing use of electric furnaces in the steel industry. When in 1916 a Philadelphia inventor brought out an electric furnace which seemed to have possibilities, one was secured for experimental purposes. Many improvements have since been made until today the Bridgeport Company is melting all its brass in electric furnaces.

The Wyatt heating element consists of an arrangement of circuits as shown. The primary is connected to the alternating current source and may be wound for any commercial voltage. The secondary consists of a V-shaped mass of metal confined to narrow passages on two sides and open on the upper side. In the narrow passages three forces operate, namely pinch effect, motor effect, and gravity effect. The head of molten metal above the V in the chamber of the furnace prevents the pinch effect from actually rupturing the circuit, although it does cause contraction which results in motion of the column in the direction of least resistance. Contraction also results in the generation of extra heat which further accentuates the motion.

At any instant the electric current in the two converging channels is in opposite directions. Therefore, a repulsion, called motor effect, is produced between the two which tends to throw the liquid out of the passages. Observation has shown that the liquid rises along the outside surfaces of the passages and descends along the inside surfaces.

The application of heat at the bottom of the mass of metal causes circulation which draws the colder metal continually to the bottom and in this way effectively distributes the heat throughout the mass.

The combined effect of these three actions is to cause a violent propulsion of metal out of both legs of the triangle which thoroughly mixes the charge and carries the heat to all parts of the bath.

Let us consider the old method. Imagine a fire in the middle of a row, the grate to which gets stopped up so that the fire does not burn as well as the others. After the caster has got the fires on either side of it properly speltered, as we call the operation of putting in the zinc, he is not likely to wait until it gets up to the proper temperature, but spelters it whether it is ready or not because he has to do this series of operations four or five times a day and he wants to get home to attend to his garden. Consequently, things in a crucible casting shop were always going wrong to a greater or lesser degree. The condition of the atmosphere affected the draft of the main chimney. Sometimes the fires drew well, sometimes they did not; sometimes the coal was of a better quality than on other days. As a consequence the product of a bank of crucible furnaces varied in very essential ways from what it is easily possible to accomplish with an electric furnace.

The caster next took the pot out on the floor and skimmed it very carefully. Now recollect that all this time the pot was giving off clouds of very disagreeable smoke. If the caster inhaled too much of it, it made him sick. He had what is called "spelter shakes." As this smoke came up in his face, he was inclined to slight the operation of skimming, which removes from the top of the pot the foreign material which does not add to the quality of the brass. The operation is always a disagreeable one and frequently the brass was not skimmed as cleanly as it ought to have been.

Now in the electric furnace the caster does not have the smoke blow in his face. The furnace door is so disposed that he can readily pull the skimmings, (which, by the way, are less than in the pot process), out into a proper receptacle. He gets none of that smoke in his face at all, and there is no reason why he should not skim thoroughly and completely. Further than that, each furnace is a unit by itself and is not dependent upon what is happening in another furnace, so that the furnace can easily be charged correctly, heated correctly, skimmed and poured correctly.

In order to have good brass, the copper and the zinc must be intimately mixed. That is done in the crucible furnace by the caster standing over the fire and putting a stirring rod down into the crucible and stirring vigorously. This requires a good deal of endurance to perform properly and one can readily see how it would be slighted when the weather is hot. Yet if that operation were not properly performed one could not get good brass, because quality depends absolutely on the most uniform possible mixture of the two constituents of the charge. The Ajax-Wyatt electric furnace stirs itself perfectly; it is impossible to make brass in one of these electric furnaces that is not stirred 100 per cent.

OPERATIONS IN THE SHEET MILL OF BRIDGEPORT BRASS COMPANY*

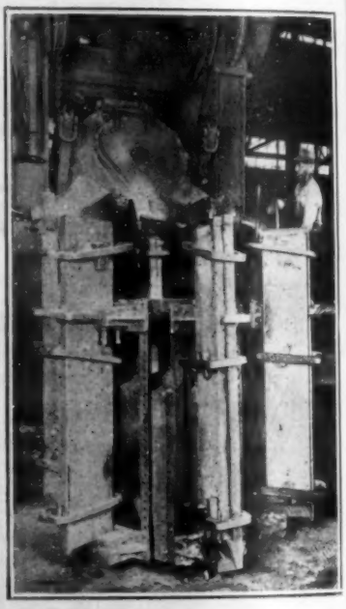
Let us assume that we are about to start on a trip through a modern brass mill for the purpose of seeing sheet brass produced from copper and zinc. The first department that we enter is the metal stores where the various metals necessary for the production of brass are segregated in bins. The metals are principally copper, zinc, lead and tin. Also brass scrap of known chemical

WEIGHING OF METAL PREVIOUS TO MELTING

analysis is used in conjunction with pure copper and zinc to produce standard brass mixtures.

Most of the sheet brass used in this country contains approximately 66% copper and 34% zinc. There are, of course, variations in sheet brass mixtures, one being the introduction of a small percentage of lead. The persons in charge of mixture control lay out the kinds and quantities of the metals to be used and these are weighed and checked on platform scales and then dumped into boxes which are conveyed to the electric furnaces.

A general impression of the Electric Furnace Casting Shop is best obtained from the view shown on page 319. A detailed description of the operation of the furnace is not necessary, as this furnace is described elsewhere.

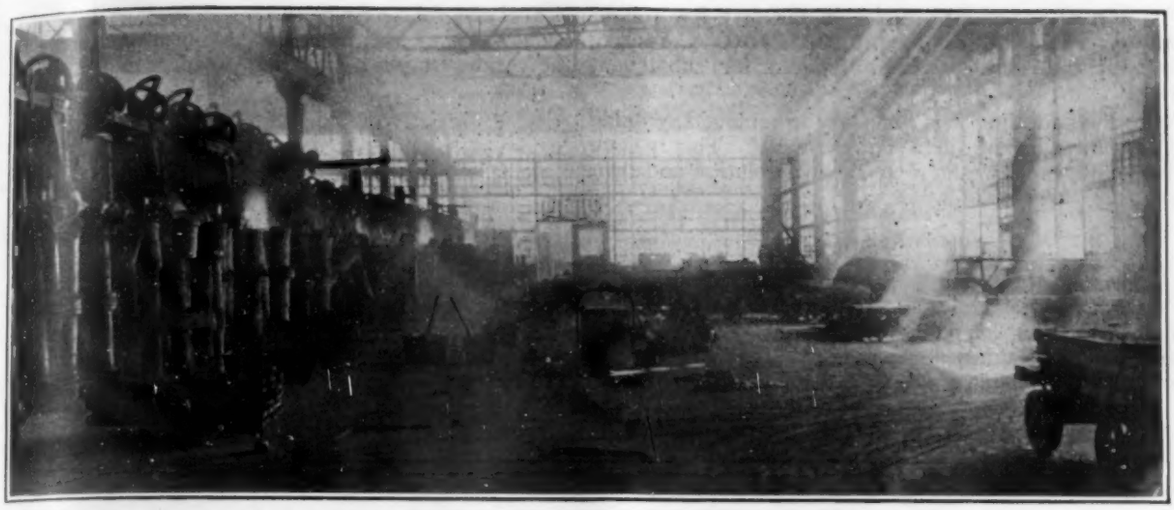


POURING SHEET BRASS BARS

The production of sheet brass commences by casting flat bars of rectangular cross section. These bars are approximately one inch thick and vary in length and width, depending upon the size of the finished sheet. (In the rolling of sheet brass the width remains fairly constant.) Steel molds, the inside faces of which are coated with an oil graphite mixture, are caused to pass in a vertical position beneath the spout of the tilted furnace and the molten brass is poured into a reservoir or strainer which is placed directly over the top opening of the mold. The purpose of the strainer is to permit several small streams of molten metal to run directly to the bottom of the mold rather than in a large single stream from the furnace, this preventing splashing of the metal. After the metal solidifies the molds are separated into two parts and the solid cast bar is dropped to the casting shop floor. The top or gate end of the bar is cut off and the bar is then delivered to the rolling mill.

The operations necessary for the production of sheet

* Contributed by Donald C. Root, Sales Engineer, Bridgeport Brass Co.



BRIDGEPORT BRASS COMPANY'S ELECTRIC FURNACE CASTING SHOP

brass are, Breakdown, Overhauling, Annealing, Pickling, Running Down and Finish Rolling.

BREAKDOWN

The purpose of this operation is to destroy the physical characteristics and crystalline structure typical of a casting and to establish those of wrought metal. This is a kneading operation and is accomplished by passing the bars longitudinally between two horizontal chilled iron rolls rotating in opposite directions. The distance between these rolls determines the thickness to which the bar is rolled. The bar is given several passes, each time the rolls being brought closer together. The effect of this is a decrease in the gage and an increase in the length. Finally the metal becomes so hard and brittle that further passes would fracture the bar. The Breakdown, like all subsequent rolling operations is done cold.

VISUAL INSPECTION OF GATE END

OVERHAULING

In order to insure a perfect surface on the finished sheet the broken down bar is subjected to an overhauling operation. The bar is first flattened by being passed over and under small diameter rolls and then caused to pass over a milling cutter which removes the surface from one side. The bar is then turned over and a similar milling cutter overhauls the other side.

ANNEALING AND PICKLING

Before further cold working the bar, it must be annealed by heating to a red heat. This may be done in a muffle whose fuel is wood, coal, coke, oil or electricity. The effect of heat upon hard brass is nicely explained by the series of photo micrographs of wrought brass crystals as shown below.

OVERHAULING OF CAST BAR

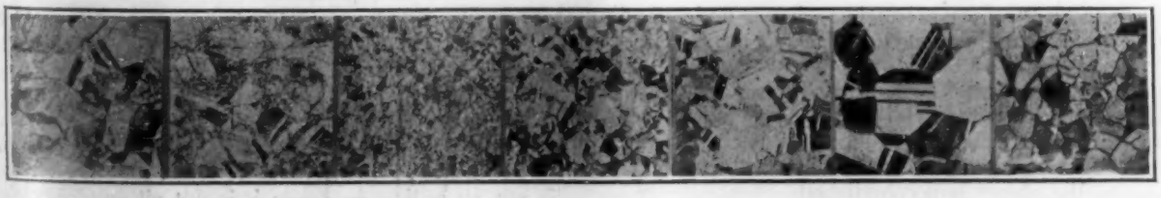
The strain bands in the hard metal are clearly discernable in a.

b. As the temperature approaches 350° C, the large drawn out crystals of the hard metal begin to break up and recrystallize. Several nucleii can be seen.

c. At 450° C. complete recrystallization has taken place.

d, e, and f. A rise in temperature from 450° C. causes the crystals to grow in size to a maximum at approximately 750° C.

g. Beyond 750° C. the metal is in danger of being burned as is represented by this photo-micrograph.



a b c d e f g

SHEET BRASS PHOTO-MICROGRAPHS

For normal annealing practice in the first few rolling operations a temperature of approximately 700° C. is used. This temperature is materially reduced for subsequent anneals.

After the annealing it is necessary to remove any oxide that may form on the surface of the metal. This is done by immersing in a weak sulphuric acid solution and then thoroughly cleaning in water.

RUNNING DOWN

The bar at this point has been broken down, overhauled, annealed and pickled. The running down is the further reduction in gauge by passing between rolls similar to the breaking down rolls. Particular attention is given to the amount of "pinch" of the metal, and as the bar increases in length it is automatically coiled as it leaves the rolls. Since the metal becomes hardened with cold working it is necessary to anneal and pickle further at various stages of running down.

FINISH ROLLING

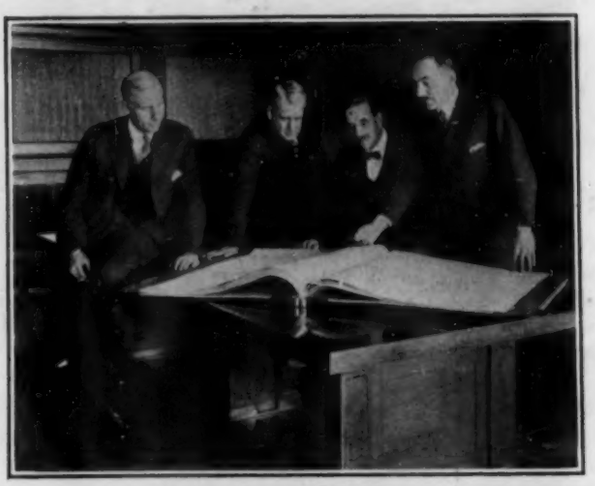
It is during the operation of finish rolling where the final specifications as to gauge, temper and surface are obtained. This operation is similar to running down with the addition of exceptional care being given to the working of the metal. The rolls used must be expertly ground and kept in first class condition. Continuous check must be given the metal as it comes from the roll and the metal must be carefully coiled and handled.

The finished sheet brass is thoroughly cleaned and brushed in sawdust. If it is desired to ship the metal flat the coil is run through a series of horizontal straightening rolls and cut to length.

INDUSTRIAL RELATIONS WORK OF THE BRIDGEPORT BRASS COMPANY*

Most of the industrial unrest, discontent, mistrust, or antagonism is due to misunderstanding; and that misunderstanding is the direct result of not having taken the workers into our confidence. If they are merely cogs in a machine, employed to do certain things, and have no interest in anything but the receipt of the pay envelope, we cannot expect intelligent harmonious progress.

There are still some people who think that the interests of management, or capital invested in a business, and the interests of the worker are diametrically opposed. That is an unfortunate belief; the interests are identical. If the worker does not understand what his part of the work



OFFICIALS OF BRIDGEPORT BRASS COMPANY. FROM LEFT TO RIGHT; R. I. NEITHERCUT, SECRETARY; W. R. WEBSTER, VICE-PRESIDENT; F. J. KINGSBURY, CHAIRMAN OF THE BOARD OF DIRECTORS AND TREASURER; C. F. DIETZ, PRESIDENT.

represents, what the management's part represents, and what the invested capital's part represents, he is bound to have a misconception of the matter and will think only in terms of the pay envelope.

The methods used for producing a better understanding between workers and management do not much matter so long as the end is attained. Some plants prefer shop committees; others attempt to work through the foremen in the various departments; others, by personal contact between the management and the men, especially if a shop is small. It does not really matter how the end is attained as long as the object is accomplished.

Some years ago the Bridgeport Brass Company started a shop-committe program. It was not very long before they learned that unless a shop-committee program carried absolute sincerity on the part of management, on the part of owners of any enterprise, the program was bound to fail. To use a shop committee merely as a blind is utterly useless and hopeless, and there is no one who more quickly senses lack of sincerity than the men in industrial establishments. Fortunately, what they undertook to do then has continued and the program has grown. The shop committees represent a very satisfactory clearing house through which all kinds of problems are settled and they constitute the direct contact between management and workers.

These committees are made up of representatives of each department elected by the workers themselves (one person for every fifty workers or less); also an equal number of representatives of the management. These committees meet every other month; but they elect an executive committee or council, which meets as often as may be necessary (at least every other month) to settle any problems that representatives of the employees want to discuss.

There are no limits on the character of the subjects that these committees discuss. Most of the questions raised at the meetings are settled there. They rarely are referred to the management unless the question involves some deviation from established policies. Such items as overtime, wages, working conditions, safety, cleanliness, sanitation are discussed fully and regularly.

The committees, being made up of such a large number of individuals representing the workers, who often are workers at the bench, offer an excellent vehicle for carrying some of the fundamental economic principles of present-day industrial enterprises into the shop in general. Of course it would be very much preferable to discuss these principles with all of the people in the shops, but when there are thousands of employees it is quite impossible to arrange a program that would not be too cumbersome and prohibitive.

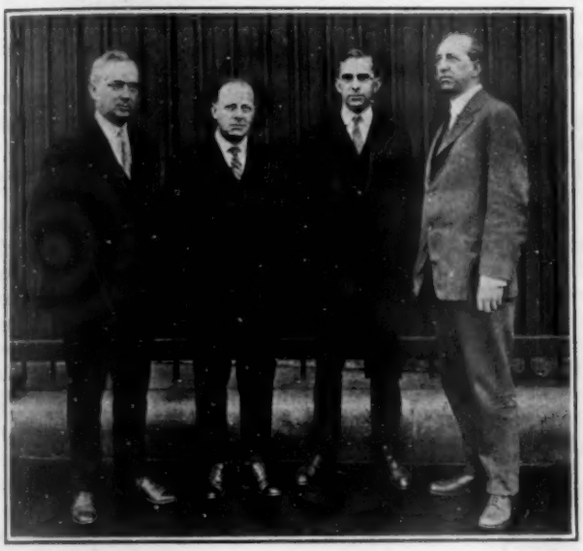
In order to do away with the mystery, they tackled first the question of cost and tried to show the worker's part in the establishment of a cost, how costs are made up; and what represents overhead. In many instances, the workers did not realize that a very large proportion of the overhead in every industrial establishment is directly due to workers themselves. It is not all office expense; it is not all selling expense; it is not all administrative expense. The proportion of wages in the production of a

* Contributed by C. F. Dietz, President, Bridgeport Brass Company.

salable product to wages that must be paid for the maintenance of a shop organization and the amounts paid for power, heat, light, tools, attendance, sanitation, etc., was a revelation to a good many men.

When special questions arose, they gave the members of the council the actual facts, showing them the operating sheets or the operating tables. For instance, about a year and a half ago, the rod mill was run overtime for five or six weeks, but did not pay overtime. There had been a hard trying period. Though there had not been much work, employment was given to the largest possible number of people. So it was thought that the increased activity from a week of 36 hours to a week of 55 hours would be very welcome. When the executive council raised the question of paying overtime, operating charts were produced and all the facts given. It was shown how during certain periods a large number of persons had been employed though at an operating loss. The following day a message was received from the council saying that it appreciated the fairness with which the question had been treated and withdrew its request for additional overtime pay.

The shop committee and council are also of immense



FACTORY EXECUTIVES OF BRIDGEPORT BRASS COMPANY. FROM LEFT TO RIGHT: E. G. OAKLEY; W. R. CLARK, GENERAL WORKS MANAGER; E. R. FEICHT; A. BREWER.

value because they give to the management the viewpoint of the man at the bench; shop problems cannot be intelligently treated unless this viewpoint is fully and accurately obtained.

In conjunction with teaching these fundamental economic truths, items were discussed that did not directly relate to the business and a lecture course organized for three successive winters, usually illustrated by lantern slides as well as by moving pictures. There was no compulsion as to the attendance at these lectures. All the employees and employer representatives were invited and usually from 150 to 200 attended. In the winter of 1923 to 1924 there were discussed such topics as "What Economics Is About and Why It Should Interest Us," "How It Happens That Things People Want Are Produced," "What Determines Prices," "What Banks Are For and How Things Are Paid For," "Transportation—How Things Are Moved from One Place to Another," "What the Government Does," "How Things Are Divided," "Industry and the Community," and "The Use of Capital." Another course discussed in rather considerable detail the various departments into which a going industry must be divided, the function of those departments, and their relation to the whole. Some of the subjects were: "The Modern Business Objective," "The Origin of Capital," "The Production Contribution toward the Accomplishment of the Business Objective," "The Sales Contribution," "The Research," "The Service." Those particular topics related directly to the activity of the Bridgeport Brass Company, but in order to arouse interest in the whole industrial structure of our present-day development, the most recent series was devoted to iron and steel, copper and brass, cloth, pottery, paper and printing, electricity, machine tools, transportation and other industries.

The purpose of all of these lectures is to use these industrial developments as a basis for hammering home certain fundamental economic truths, and every one of these developments lend themselves excellently to the accomplishment of that purpose. In other words, industry can develop only by the unlimited productivity of each individual; that the lump-of-labor doctrine, if practiced generally, cannot permit of industrial development such as we have today; that only by a free and unlimited application of efforts and creative ability can the necessary wealth be produced for investment for the further development of industrial enterprises; that for industry to develop and endure, a liberal satisfactory profit must come to that industry. And with that profit—the need of that profit—from the activities of an industry, will come development, expansion, growth, the creation of new opportunities for workers, the requirement of more skilled men, more opportunities in the executive staffs, all of which will be of benefit to the industrial people of today by bringing about the expansion in the future.

The results of these lectures seem to be very satisfactory. A great deal of interest is manifested by the workers and by the junior executives, as shown by their questions, not so much during the time these courses are presented but in the discussions that occur outside. It is felt that a progressive activity in bringing the workers into close touch with the management's problems can only result in a much more harmonious, progressive attitude on the part of the workers and will do away with the discontent that is generally the result of misunderstanding due to the mysteries that appear to be surrounding any business enterprise.

It is hard to measure in terms of dollars and cents just what a program of this kind brings to an establishment. The management of the company thinks that it has reduced the turnover. Of course, with this general program go a great many other things, such as sick benefit and life insurance, athletic and recreational activities. At the present time 40 or 45 per cent of the employees have been employed five years or more. A vacation plan provides those who have been employed five years with a vacation of one week with pay; those employed ten years get two weeks with pay. This may seem like extravagance but it more than pays for itself every year.

Whether one can directly attribute to this general program the reduction in man-hours required to do a certain amount of work in its entirety is problematical; but that it contributed something to it is certain. A shop that is considered by workers generally as fair-minded will draw to it the better class of workers, and the fact that they stay is evidence that they are satisfied with their treatment and the fairness with which their problems are being treated or being considered.

Growth in Zinc Base Die Castings

Notes on the Die Casting Alloy Zinc, 92; Aluminum, 5; Copper, 3. Part 1.

Written for The Metal Industry by W. G. JOHNSON, Metallurgist, Precision Castings Company, Inc., Syracuse, N. Y.

INTRODUCTION

Perhaps one of the most important problems in the die casting industry today is the discovery of a zinc-base alloy having good casting properties, and permanency as regards strength, ductility and dimensions.

In Raw Material, Vol. V., No. 9, October, 1922, there was published a paper by Messrs. Brauer and Pierce entitled "Insuring Permanence in Zinc-Base Die-Casting Alloys." They state:

"1. Since all instances of failure of zinc alloys have been in those containing aluminum, a very thorough study was first made on alloys made from the purest zinc obtainable and high grade aluminum. Carefully measured and weighed specimens were exposed in steam, in air at 100°C, (212°F) in carbon dioxide, and in oil. Only the specimens exposed to steam, change. These gained in weight and increased in thickness.

2. That annealing at temperatures up to 100°C, (212°F) for periods up to 24 hrs. produces no change in the 92 zinc, 5 aluminum, 3 copper alloy. Annealing at 100°C. or above for a day causes a reduction in ductility, but no warping or swelling. These tests show that the alloy is stable."

The writer has made a study of this alloy, using the results obtained together with those found on electrolytic zinc containing as impurities .007% lead, .03% cadmium, and .03% iron, for comparative purposes with various alloys experimented with.

PURPOSE

Because of the fact that all zinc-base alloys containing aluminum in amounts above .5% show a distinct phase change below the solidus it was thought that in addition to growth which would naturally attend oxidation there would be found some changes in dimension as caused by a constitutional change of some nature. In order to ascertain this the following work was conducted.

CHEMICAL ANALYSIS

Analysis of the alloy used in these experiments was as follows:

Copper	2.92%
Aluminum	4.87%
Zinc	Remainder

THERMAL ANALYSIS

The transformations existing above and below the solidus were determined. About 20 grams were melted in a test tube of pyrex glass which was contained in a small electric furnace. Inverse rate cooling curves were taken by means of a platinum thermocouple and a Leeds-Northrup Precision Potentiometer. Figure 1 shows the points found. Of most importance from the standpoint of this paper is the phase change $\beta \rightleftarrows \eta + \gamma$ occurring at 258° C. (496°F.)

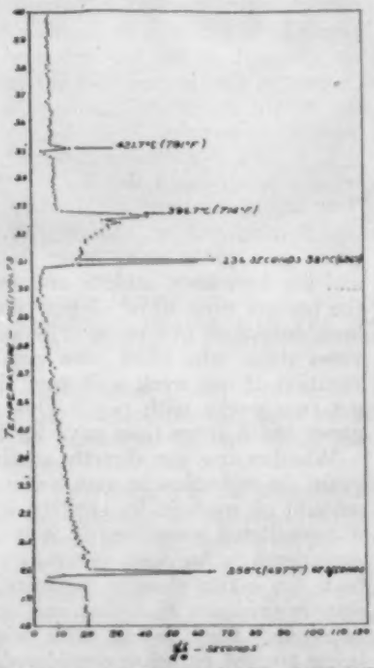


FIG. 1. INVERSE RATE COOLING CURVE

TEST PIECE—APPARATUS—PROCEDURE

Tensile test bars were die-cast at a temperature of 466°C. (870°F.)—482°C. (900°F.) in a standard form as illustrated in Figure 2. The testing was done within 20 days after casting on those not treated in any manner. Tensile test bars were held in steam and groups of 8 were withdrawn every 50 hrs. and tested. Others were placed in a furnace, held at a temperature of 93°C. (200°F.)—102°C. (215°F.) and duplicates tested every 25 hrs. The effects of time and temperature on the ductility when test bars were held at various times and temperatures above and below the point 258°C. (496°F.) were also studied.

The steam bath was constructed of copper sheet with a lid. Water was held to a constant level by an automatic regulator. The temperature of the water was held at 100°C. (212°F.) ± 2.8°C. (±5°F.) and the steam saturated atmosphere at 93°C. (200°F.) ± 2.8°C. (±5°F.).

Test specimens used for growth and weight test were machined to the dimensions 2" x 1" x ⅛" and suspended in steam, boiling water, and paraffine. Pyrex beakers containing water and paraffine were immersed in the boiling water of the bath proper. A flask containing paraffine was suspended in the steam saturated atmosphere. Thus, two parallel tests were being run at the same time, boiling water versus paraffine, and steam versus paraffine. Measurements were taken every 50 hrs. up to and including 300 hrs.

RESULTS

TENSILE PROPERTIES

Table 1 and Figure 2 give the results obtained on the tensile bars after holding in steam and dry heat for the times stated.

TABLE I.—EFFECT OF STEAM & DRY HEAT ON THE TENSILE PROPERTIES

Time Held	Steam at Temperature of 93°C. (200°F.) ±2.8°C. (±5°F.) Oxidation & Constitutional Change		*Dry Heat at Temperature 93°C. (200°F.) —102°C. (215°F.) Constitutional Change		Steam Minus Dry Heat = Oxidation	
Hours	Tensile Strength lb./sq. in.	Percent Elongation in 2 inches	Tensile Strength lb./sq. in.	Percent Elongation in 2 inches	Tensile Strength lb./sq. in.	Percent Elongation in 2 inches
0	41,900	2.0	41,900	2.0	.....	...
25	.....	...	34,500	1.75	.....	...
50	31,000	1.5	31,500	1.5	500	0
75	.....	...	29,000	1.25	.....	...
100	25,850	.75	27,250	1.0	1,400	.25
125	.....	...	26,500	1.0	.....	...
150	24,250	.50	26,850	1.0	2,600	.5
175	.....	...	25,500	.75	.....	...
200	21,250	.25	24,400	.75	3,150	.5
225	.....	...	25,150	.75	.....	...
250	18,000	0	24,250	.75	6,250	.75
275	.....	...	23,600	.5	.....	...
300	13,800	0	23,500	.5	9,700	.5

*Test pieces were weighed at intervals and the increase in weight found as caused by slight discoloration on the surface revealed that the amount of oxidation was negligible.

It is found on inspection of the dry heat figures and

curve that a marked effect is exerted on the tensile properties, particularly the strength, and that this effect must be caused by a constitutional change taking place. This effect is found up to a certain point where there is a lag, the alloy undoubtedly being nearer to equilibrium. From then on reference to the steam curve shows that the effects of oxidation is very noticeable, the strength dropping rapidly. Subtracting the results in dry heat from those in steam explain the deleterious effect of oxidation. The results of the ductility tests were very interesting. Time and temperature above and below the transformation temperature 258°C. (496°F.) rate of cooling from above this temperature, and age of the test bars prior to treatment all governed more or less the final degree of bend obtainable. Test bars 20 days old withstood the embrittling effect of prolonged heating at various temperatures below 258°C. (496°F.) slightly better than those aged six weeks at room temperature. The higher the temperature below the transformation point and the longer the time held, the more brittle the bars became. Duplicate bars which had been treated along with those that were so brittle that they broke without any bend at all, were subjected to various temperatures and held various lengths of time above 258°C. (496°F.) Some were quenched in water and others cooled in air. A return to ductility was accomplished after holding bars only 30 minutes at 288°C. (550°F.) For a given time and temperature bars quenched in water showed greater ductility then those air cooled. As the temperature was raised and the time held increased, the more ductile became the bars, until a time and temperature was reached (in the case of these thin section test bars, a temperature of 316°C. (600°F.), 2 hours holding, and water quenched) where the ductility obtained was more than immediately after casting.

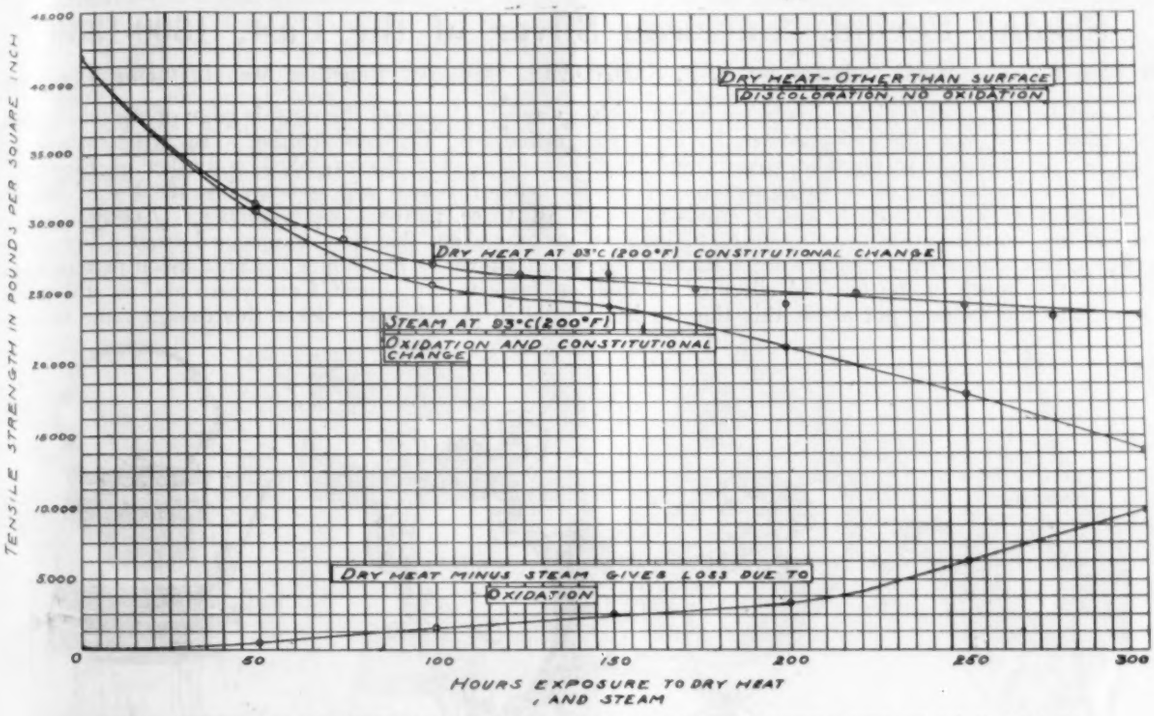


FIG. 2—EFFECT OF EXPOSURE TO DRY HEAT AND STEAM AT TEMPERATURE OF 93° C. (200° F.)

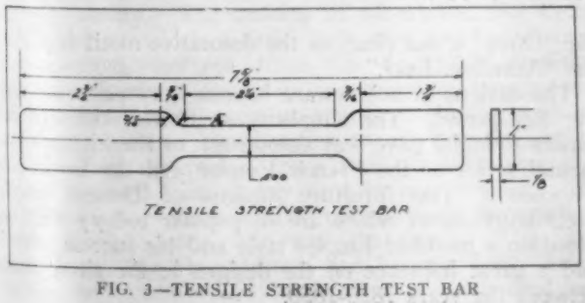


FIG. 3—TENSILE STRENGTH TEST BAR

INCREASE IN WEIGHT

In Table II, Figure 4 is shown the increase in weight with increase in oxidation. The weighing was done on the specimen. Weighing of specimens immersed in paraffine (after all paraffine was removed) revealed no appreciable differences in weight other than that which was the result of some slight soaking of the paraffine into the metal. No curve or table is given for the figures obtained for the reasons above.

TABLE II. — INCREASE IN WEIGHT IN STEAM AT TEMPERATURE OF 93° C. (200° F.).

Time Held Hours	Increase Grams Per Square Inch
50	.007
100	.017
150	.030
200	.045
250	.058
300	.074

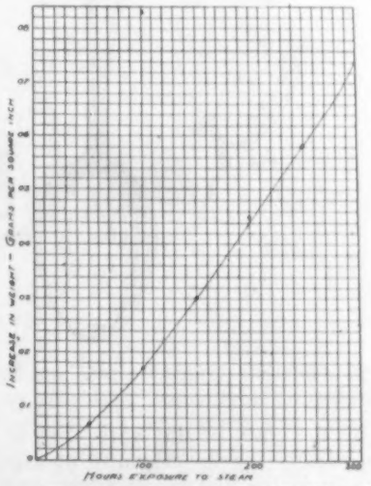


FIG. 4—INCREASE IN WEIGHT ON EXPOSURE TO STEAM AT 93° C. (200° F.)

It was noted that upon fracturing the paraffine-immersed specimens at the conclusion of the tests, and inspection under the microscope, they showed no penetration of paraffine other than a few porous spots near the surface.

This article will be concluded in our September issue.—Ed.

Three Periods of American Silversmithing

A Series of Three Articles on the Development of Silversmithing in America. First, American Colonial Silver, 1620-1800; Second, American Silver of the Past 1800-1880; Third, American Silver of the Present 1880-1924.

Second Period, American Silver of the Past, 1800-1880

Written for The Metal Industry by A. F. SAUNDERS, Designer, Benedict Manufacturing Company

The second period of American silverware began with the year 1800. The War for Independence having been won, the people of the new republic now turned their energies toward the building of a great nation. It was a period of hard work for everyone and it stands to reason that but few families possessed the means to indulge their tastes in such luxuries as silverware. In fact, old records show that much of the fine old silver of colonial make went into the melting pot about this time to help pay the costs of the war. Yet in spite of these discouragements the silversmiths managed to keep busy, especially in the making of silver spoons.

Because of the intense feeling against everything English during the first half of the 19th Century, French styles became the fashion and this influence shows plainly in the patterns of silverware made between 1820 and 1860. In spoons the "French Fiddle" became the vogue. At first it was perfectly plain. Then a fine thread border was added around the outside edge of the handle and was called the "Threaded Fiddle." By 1840 such decorative features as a Rococo Shell, a Basket of Flowers, or a Sheaf of Wheat was embossed at the top of the handle. All three patterns were popular. Another pattern to appear about this time was copied from a French design and known as the "Olive." This spoon pattern remained a favorite for almost forty years and is still made and sold in plated ware. How this design came to be called the "Olive" is not clear, as the decorative motif is plainly the "Acanthus Leaf."

The designs in hollowware became very elaborate during this period. The simplicity so characteristic of the earlier Colonial gave way completely to the highly ornamental styles of the French Empire and the Louis XV (Rococo). The furniture designs of Duncan Phyfe (reproductions of which are so popular today) were all based on a modified Empire style and his success with it had a great influence on the designs in the silver made between the years 1820-1850.

PLATE 3. SILVERWARE FROM 1820 TO 1860

* Part 1 on American Colonial Silver was published in our issue of April, 1925.

With the advent of electro-plating which became a really practical process about 1845, the making of Sheffield Plate was given up almost entirely, as the Yankee manufacturers of pewter and britannia wares were quick to realize the commercial advantages of the new process for the making of cheaper silverware It was useless for the Sheffield Plate manufacturers to try to compete with this process. By 1860 the country had increased enormously in population. The great fleets of swift Yankee Clipper ships had brought the wealth of the world to our shores. Our farms were producing abundant crops, the people as a whole now had money to spend on things other than bare necessities. While at this time the United States was still essentially an agricultural and a maritime nation, great progress had been made along manufacturing lines. But unfortunately the devlopment of our artistic taste had not kept pace with our industrial growth, so the ten years following the close of the Civil War witnessed a still greater period of chaos in the art of the country. The making of silverware, like everything else in which artistic taste plus good craftsmanship counted, suffered from this deplorable condition. Machine drawing, stamping and spinning largely supplanted hand work such as smithing, chasing and engraving. It is no exaggeration to say that the general taste during the period from 1860 to 1880 was at a lower standard than at any time before or since. Our industrial arts were depending entirely upon importations from foreign lands. It was the era of "Jig-Saw" ornament. The shop system had become firmly established, the invention and development of mechanical processes attained a high degree of perfection. Quantity production rather than quality of product became the ideal. The artistic and intrinsic value of good design and fine craftsmanship was sacrificed upon the altar of gaudy show, drawing upon the art and arts of every other country, originating none of our own. The results were naturally far from happy. The American homes, even those of the wealthiest, were filled with a hodge-podge of every style under the sun.

The Centennial Exhibiton at Philadelphia in 1876 celebrating the completion of the first Century of American Independence, was the first big factor in the awakening of our nation to its woeful lack of artistic taste. The revelation which it made to the several million American visitors of the art of the Old World created a profound impression, shaking the complacency of the nation and arousing a popular interst, hitherto lacking, in art as a factor in every day life.

The reaction set in about 1880. Travel to Europe was rapidly increasing in volume and returning travelers, like the ancient Roman hosts returning from their campaigns in Greece, were bringing back objects of art from every country in Europe, which inspired new conceptions and ideals of artistic beauty. At last we were awake to our shortcomings and the next ten years brought about a wonderful change. Slow at first, but gradually gathering momentum as time went on, we began to attain success in domesticating various industrial and decorative arts, furniture, ceramics, stained glass and metal work, and the very first of these arts to respond to the new order of things was that of the silversmith. Great credit is due such old firms as Gorham, Tiffany, Shiebler, Whiting, Reed and Barton and others, who made determined ef-

PLATE 4. SILVERWARE FROM 1870 TO 1880

forts to raise the artistic standard of their wares. How well their efforts succeeded is shown in the highly artistic quality of the silverware made in America today.

The sketches used to illustrate this article are authentic in every particular, having been made from actual articles of silverware of the highest standard in design and workmanship of the period they represent. It may seem difficult for the younger generation educated to the present day high standards of artistic taste to realize that for many years our art was the laughing stock of the world.

PLATE 3

Fig. 1. Silver teaspoon of about 1825. This pattern was called the "Shell Tipped," a variation of the old French Fiddle Head.

Fig. 2. Silver teaspoon of about 1845, known as the "Olive" pattern, which was copied from an old French Design. The mechanical process of making spoons by means of steel rolls came into use about this time.

Fig. 3. A solid silver pitcher made in 1842. This piece was made by Osmon Reed of Philadelphia and was considered an exceedingly fine example of the silversmith's art of that period. Its decorative features form a grand mixture of French, Dutch and English styles. Evidently its maker wanted to please everybody.

Fig. 4. Solid silver coffee pot, part of a six piece tea service presented to Fire Chief Zophar Mills in 1853, by the Firemen of the City of New York. This set is on exhibition at the Metropolitan Museum of Art. It is thoroughly representative of the best made American silverware of the middle 19th Century. Its design shows the French Rococo influence.

Fig. 5. A curious travesty of Neo-Grec ornamentation in the form of a solid silver hot water kettle. This masterpiece is characteristic of design in silverware about the time of the Civil War.

PLATE 4

Fig. 6. Part of a silver tea and coffee service to match the "Classic" hot water kettle, Plate 3.

Fig. 7. This was considered about the last word in Prize Trophy design; vintage 1870. Note the imposing figure of "Victory" on the cover. Like as not this self same "Victory" ornamented the black marble mantle clock; also the top of the parlor stove.

Fig. 8. A solid silver tea urn, exhibited as a very fine piece of silverware at the Centennial Exhibition 1876. Compare this article with the Paul Revere urn, Fig. 3, Plate 1.

Fig. 9. A silver plated britannia metal tea and coffee set of 1879. This set is an excellent example of the so-called high grade, "Quadruple Silver Plate" of the late seventies.

The third and last article of this series will describe the gradual improvement in the work of the silversmith from 1880 up to the present time.

Brass Solutions

Written for The Metal Industry by JAMES GARDE, Plater

In my days of learning the trade I worked under the very ablest platers of their time and they all did the same things in different ways—though they all did them right. But by taking their ways as a base to guide me I have found a few short cuts.

There are a few rules to follow to get good results, and they do not alone apply to a brass solution, but to every solution that I have worked or seen worked successfully. One of them is that metal must be thoroughly and very finely cut. I have found that the finer the cut the finer the deposit, the better the color and the closer the plate. In a brass solution where you are to cut and use two metals if you only cut one of them and not the other then you have them off color. Once they are added to the solution they will stay there for you can put in but you can't take them out very well. And when you try to cut them after you have added them it takes a lot of time and wastes chemicals.

The last time I proved this rule was in the Pawtucket Screw Company of Pawtucket, R. I. We used the common everyday type of plating barrel and equipment, a 6 volt, 250 ampere dynamo, and the solution was water, 1 gallon; carbonate of copper, 4 oz.; carbonate of zinc, 1¾ oz.; cyanide of soda, 8 oz.; ammonia, 26°, 1 quart; 1 pound of single nickel salts cut with cyanide of soda. We half filled the tank with cold water. Then in a barrel we put cold water, carbonate of copper and nickel salts, and in an earthen basket we put the cyanide and swilled it around in the water and carbonate until it was cut to an amber color then we added it to the water in the tank and we put in a batch, but we got no color. We decided that there was too much cyanide or metal not cut or both. We cut the carbonate of zinc using cyanide and ammonia to cut it and then we added that to the solution and we got a color but a very weak plate.

Then we used for a batch 80 pounds of machine screws 1¾"x8/32", we ran them for 45 minutes and dried them, using the soap, hot water and cold sawdust, we plated four batches and then we took out the solution, boiled it and put it back in the tank. Then we did four more batches. We had a better color and a better plate but in one day all the first four batches were stained and they had very bad case of spotting out. The others stood for four months in very good condition without lacquer.

The reason for this experiment was to prove that it is not alone the formula, of so much of this and so much of that, but the way you put them together and keep them that will keep any solution in condition.

If we are to keep it in a good condition we must get rid of the sludge and every Monday morning, as we allow for the best over Sunday to give a better settling. We took a piece of hose and syphoned off the bottom. We kept it up as long as we got bad solution, moving the syphon all around the bottom of the tank, and then we added whatever it needed in a new hot solution.

We always found that where there is a bad case of spotting out it is from much color and not enough plate. Let us assume that we dissolve in water, 1 pound of a metal salt and we have one half the proper amount of a conducting salt to deposit it. Then we have one half dead metal in the solution that is of no use at all, or if we have the same case reversed, we have one half the amount of metal and twice the amount of conducting salt, then we are just as badly off since we get all color and not enough plate to balance, and our deposit is very coarse. As we all know too much cyanide will result in no deposit so we must set a standard as our guide. A very good rule we found to follow was to dissolve the cutter first and then add the metal salt and not to try to hurry. One of the very bad things for a brass solution is a chill and when it gets cold it will do a lot of things that are very bad in both color and plate.

Standard Classification for Old Metals

The following standard classification for Old Metals has been adopted by the National Association of Waste Material Dealers, Inc., effective from July 1, 1925. Dealers or consumers wishing to have these circulars mailed to them as they are issued, should forward their request direct to the Secretary, Charles M. Haskins, Times Building, New York.

Heavy Copper

This shall consist of copper not less than 1-16 inch thick, and may include Trolley Wire, Heavy Field Wire, Heavy Armature Wire, that is not tangled, and also new copper clippings and punchings, untinned and clean and copper segments that are clean.

No. 1 Copper Wire

To consist of clean untinned copper wire not smaller than No. 16 B. & S. Wire gauge to be free from burnt copper wire which is brittle and all foreign substances.

No. 2 Copper Wire

To consist of miscellaneous clean copper wire such as of necessity would be taken out of the Heavy Copper and the No. 1 Copper Wire, but to be free of hair wire and burnt wire which is brittle.

Light Copper

Shall consist of the bottoms of kettles and boilers, bath tub linings, hair wire, burnt copper wire which is brittle, roofing copper and similar copper, free from radiators, brass, lead and solder connections, readily removable iron, old electrotype shells and free of excessive paint, tar and scale.

Composition or Red Brass

Shall consist of red scrap brass, valves machinery bearings and other parts of machinery, including miscellaneous castings made of copper, tin zinc and / or lead, no piece to measure more than 12 inches over any one part or to weigh over 60 lbs., to be free of Aluminum and Manganese, also free of railroad boxes, cocks and faucets, gates, pot pieces, ingots and burned brass.

Railroad Bearing

Shall consist of railroad boxes or car journal bearings, must be old standard used scrap, free of yellow boxes, also iron-backed boxes, and must be free of babbitt, also free of excessive grease and dirt.

Cocks and Faucets

To be mixed red and yellow, free of gas cocks and beer faucets; shall be at least half red.

Heavy Yellow Brass

Shall consist of heavy brass castings, rolled brass, rod brass ends, brass screws and tinned or nickel plated brass tubing; to be free of iron and dirt and must be in pieces not too large for crucibles; no piece to measure more than 12 inches over any one part. Must be free of manganese mixtures and condenser tubes. Must be free of aluminum brass containing over 0.20% aluminum.

Yellow Brass Castings

Shall consist of brass castings in crucible shape, that is, no piece to measure more than 12 inches over any one part; must be free of manganese mixtures and must not contain over 0.20% aluminum.

Light Brass

Shall consist of light sheet brass, forks and spoons, miscellaneous brass that is too light for heavy, to be free of any visible iron, radiators, gun shells and containing paper, ashes or iron, loaded lamp bases and clock works.

New Brass Clippings

Shall consist of the cuttings of new sheet brass to be absolutely clean and free from any foreign substances.

Brass Tubing

Shall consist of brass tubing, free of nickel plating, tinned, soldered or tubes with cast brass connections. To be sound, clean tubes, free of sediment and condenser tubes.

No. 1 Red Composition Turnings

To be free of plastic, railroad car box turnings, aluminum manganese and yellow brass turnings; not to contain over 2% free iron; to be free of grindings and foreign material, especially babbitt. Turnings not according to this specification, to be sold subject to sample.

No. 1 Yellow Rod Brass Turnings

Shall consist of strictly rod turnings, free of aluminum, manganese, composition, Tobin and Muntz metal turnings; not to contain over 3% free iron, oil or other moisture; to be free of grindings and babbitts; to contain not more than 0.30% tin and not more than 0.15% combined iron.

No. 1 Yellow Brass Turnings

Shall consist of yellow brass turnings, free of aluminum, manganese and composition turnings; not to contain over 3% of free iron, oil or other moisture; to be free of grindings and babbitts. To avoid dispute, to be sold subject to sample.

No. 1 Pewter

Shall consist of tableware and soda fountain boxes, but in any case must test 84 per cent tin. Syphon tops to be treated for separately.

Auto Radiators (Copper and Brass)

Ford—2 lbs. deduction on a Ford plate; ¾ lb. for each iron water connection; 1 lb. for each side sheet iron strip. All other radiators to be subject to deduction for actual iron.

Zinc

Must consist of clean sheet and cast zinc, also cast batteries to be free of loose oxide and dross, salamoniac cans and other foreign materials.

Tin Foil

Shall consist of pure foil free of lead compositions and other foreign ingredients and matters.

Electrotype Shells

Must be hand picked and free of loose dros and chunks of dross.

Battery Lead Plates

Shall consist of dry battery lead plates, moisture not to exceed 1 per cent, allowance to be made for wood, rubber and paper and excess moisture.

New Sheet Aluminum Clippings

Shall consist of new sheet aluminum and cuttings. Must be free from oil, grease and any other foreign substances. Must be guaranteed not less than 98 per cent pure aluminum.

Aluminum Wire

Shall consist of aluminum wire guaranteed 98 to 99 per cent pure aluminum and must be free from corrosion and any other foreign substance.

Painted Sheet Aluminum

Shall consist of painted sheet aluminum and must be absolutely free from iron, dirt or any other foreign substance.

Aluminum Castings

Shall consist of aluminum castings, free from iron, babbitt, brass and any other foreign substance. Must not exceed 2 per cent of oil and grease.

Old Sheet Aluminum

Shall consist of old and manufactured sheet aluminum. Must be free from painted sheet aluminum, iron, dirt and any other foreign substance.

Aluminum Borings

To avoid dispute, should be sold subject to sample.

Aluminum Foil

Shall consist of Pure Aluminum Foil, free from paper and any foreign ingredients.

Babbitt Metal

Shall contain bearing metal of all kinds. Shall not contain scrap hard metal, Allen metal (which is copper and lead alloy) die cast, zinc boxes of type metal.

Monel Metal Scrap

Must be in sheets, clippings, castings, bars or rods. Must be free of iron and other foreign materials. To avoid disputes, to be sold subject to sample.

Monel Metal Turnings

Must be free of iron and undue percentage of oil and moisture. To avoid disputes, to be sold subject to sample.

Foundrymen's Convention

Institute of Metals Division Will Meet with Foundrymen's Association at Syracuse, October 5-9, 1925

As has been the custom the past few years, the fall meeting of the Institute of Metals Division of the A. I. M. E. will be held in connection with the American Foundrymen's Association at Syracuse, New York, the week of October 5 to 9. Three joint sessions have been planned, a general session on metal topics, a session on aluminum-alloy topics, and a third meeting will be a round table luncheon discussion on brass foundry problems. The tentative schedule of these meetings is as follows:

JOINT OPENING MEETING ON GENERAL NON-FERROUS TOPICS, MONDAY, OCTOBER 5, 2 P. M.

The Advantages of Recuperation in Connection with High Temperature, by Col. H. D. Savage, Combustion Engineering Corporation, New York City.

The Present Status of the Investigation of Fatigue of Non-Ferrous Metals, by H. F. Moore, University of Illinois, Urbana, Illinois.

Some Refractory Problems in the Non-Ferrous Electric Furnace Casting Shop, by G. F. Hughes, Bridgeport Brass Company, Bridgeport, Conn.

Temperature Control of Non-Ferrous Alloys, by R. L. Binney, The Bunting Brass and Bronze Company, Toledo, Ohio.

ALUMINUM ALLOYS SESSION, TUESDAY, OCTOBER 6, 10 A. M.

Aluminum-Alloys in Air Craft, by S. Daniels, Engineering Division, Air Service U. S. A., McCook Field, Dayton, Ohio.

Some Notes on the Founding of Light Alloys, by R. de Fleury, Paris, France. Annual exchange paper of the Association Technique de Fonderie de France before the American Foundrymen's Association.

Mechanical Properties of the Aluminum-Copper-Silicon Alloy as Sand Cast and as Heat Treated, by Samuel Daniels and D. M. Waner, McCook Field.

Aluminum-Alloy Permanent Mold Castings, by J. B. Chaffee, Jr., Permold Company, Cleveland, Ohio.

The round table discussion will be held 12:15 p. m., Tuesday, October 6, with George K. Elliott, of the Institute of Metals Division, as chairman. This session is to be devoted to an informal discussion of shop problems and should be of especial interest to shop foremen and superintendents. No special papers will be read, as the discussion will be on topics introduced by those present.

In addition to the joint session, foundrymen and metallurgists will be interested in the A. F. A. sessions on refractories, sand control and shop management. The exhibit of foundry equipment and supplies held in conjunction with the technical meetings is one of the greatest educational opportunities of the year for those interested in the foundry industries. The latest developments of foundry equipment will be shown by working exhibits.

FOUNDRY INSTRUCTORS TO MEET

A special invitation is being extended by the American Foundrymen's Association to all technical school and foundry instructors to meet at Syracuse, N. Y., at the time of the Annual Convention. An informal gathering is being planned by the committee under the direction of Prof. A. E. Wells, Head of the Shop Laboratories, Cornell University, assisted by John Grennan, University of Michigan, and William Dosey, Carnegie Institute of Technology. Two or three prominent foundrymen are being secured to address a dinner gathering of the group who may accept the hospitality of the Association. Exhibits and sessions will be open to the instructors attending.

NEW OFFICERS

The Nominating Committee for the year 1925, consisting of Past Presidents, W. R. Bean, Chairman, C. R. Messinger, and G. H. Clamer, and members elect W. W. Cheney, Robert Crawford, S. T. Johnston, and T. Raymond Scott, elected by mail ballot of the members, have unanimously nominated the following as officers and directors of the association:

For President to serve for one year:

A. B. Root, Jr., Mechanical Engineer, Hunt-Spiller Manufacturing Corporation, Boston, Mass.

For Vice President to serve for one year:

S. W. Utley, Vice President and General Manager, Detroit Steel Casting Company, Detroit, Mich.

For Directors to serve three year terms each:

Fred Erb, Foundry Manager, Packard Motor Car Company, Detroit, Mich.

C. E. Hoyt, Secretary, American Foundrymen's Association, Chicago.

Jesse L. Jones, Metallurgist, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

L. W. Olson, Works Manager, Ohio Brass Company, Mansfield, Ohio.

Herbert S. Simpson, President, National Engineering Company, Chicago.

THE METAL INDUSTRY

With Which Are Incorporated
THE ALUMINUM WORLD, COPPER and BRASS, THE BRASS FOUNDER and FINISHER
THE ELECTRO-PLATERS' REVIEW

Member of Audit Bureau of Circulations and The Associated Business Papers

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Contents

Buyers' Guide—Advertising Page 71. Edition this month, 6,000 copies.

EDITORIAL

SHIFTING ALUMINUM CENTER

The news that the Aluminum Company of America will build a large plant in Quebec, Canada, has caused a great deal of speculation as to the results of this move upon the industry in the United States. According to newspaper statements, this may mean that the aluminum industry will remove its working headquarters from the United States to Canada.

At the present time all attempts to judge such a statement must be merely speculative. That aluminum producers had contemplated the establishment of a large plant in Canada has been surmised for some time. Cheap power is the magnet which draws aluminum production plants, and it seems that some of the cheapest power available, just now at any rate, is in Canada. To state however, that the center of the aluminum industry will leave the United States is to permit one's imagination to over-step reasonable bounds. At the present time this country is the largest consumer of aluminum, and the American producer has by all odds the major share of domestic business. Foreign aluminum is sold only at a lower price and in such quantities as can be spared from foreign consumption. Therefore, so far as American consumption is concerned, there is no need of moving the producing headquarters. The primary purpose of a plant in Canada would be for export. American costs are comparatively high and American production has to be protected by a tariff to compete with foreign aluminum in this country. American aluminum finds it difficult, if not impossible, to compete abroad. Obviously, then the foreign demand must be supplied by aluminum manufactured under more favorable conditions.

Outside of the United States probably the widest field for the use of aluminum is the British Empire. The various countries of this Commonwealth reciprocate in allowing a tariff preference to each other. Consequently, a manufacturer in Canada gets the benefit of this, which is a valuable assistance, while in shipping to any other foreign market, such as China or Japan, he is at least as well off as any other producer.

The most pertinent fact which has been virtually overlooked in these newspaper articles is that it is almost always more profitable to produce for domestic purposes in a market having a tariff than to attack it from the outside, paying this tariff. It is therefore absurd to suggest that a producer in the United States, enjoying five cent protection on his metal would deliberately go outside of the country to produce simply for the pleasure of paying this duty. The low costs of production would not compensate for this differential, since at the present time the cost of power which is put into a pound of aluminum is only from two to three cents.

In the United States at the present time there are approximately half a million horse-power tied up with the production of aluminum. The capital investment involved in these plants including the dams, conduits, generating and converting machinery, cannot be less than eighty to one hundred million dollars. By what process of reasoning can anyone argue that this investment is to be written off in favor of another plant located outside the country? Even if the power demands of the various territories were sufficient to turn over the above machinery to industrial power production, there would still remain a large proportion of special plant which could not be used and there would have to be a further investment in the shape of transmission lines to render the present plants useful for fitting into power networks.

The plant in Canada will enable the Aluminum Company to enter actively into the foreign market. It will not be large enough for some time to effect American production markedly, nor will it be economical to permit it to do so, thereby closing down American plants, unless at some future date the tariff on aluminum is removed and foreign aluminum makes it impossible for American production to continue. This is hardly imminent.

This project must, therefore, be viewed as one of expansion on the part of the Aluminum Company of America. It will become not only the sole American producer, but a real force in foreign aluminum business. The American industry which is largely domestic should be only slightly affected if at all.

THE GERMAN METAL BUSINESS

Recently, very illuminating notes have been appearing on the progress of the German metal industries in United States Commerce Reports. Metals in general have been very dull although imports have been large. In April, 1925, copper was 9 per cent below its price on January 1, 1925; zinc had dropped 10 per cent; tin 13 per cent and lead 26 per cent. Manufacturers are purchasing only from hand to mouth.

It is well known that Germany is a manufacturer rather than a producer of metals, zinc being its only primary material. Its aluminum is imported largely from Switzerland and Norway; antimony from China; copper, virgin and scrap, largely from the United States, although some comes from Belgium and Belgian Congo. Poland furnishes most of its lead, the United States' contribution varying from 15 per cent to 35 per cent. Nickel is, of course, of Canadian origin. Zinc comes largely from Belgium and Poland with the United States furnishing 20 per cent tin from the same sources as the rest of the world must use, namely, Netherland East Indies, the Malay Peninsula and Great Britain.

A conspicuous development has been the production of raw aluminum which has increased from 800 tons in 1913 to 12,000 tons in 1923. The consumers are railroads and automobiles with aviation showing progress. The consumption in 1923 was about one-third greater than in 1913 while the average consumption of the heavy

metals was only one-third of pre-war. Bauxite is largely imported from France and Italy.

Magnesium is obtainable in large quantities from the liquors of the potash industry. The Griesheim-Elektron, Frankfort-on-the-Main, produces magnesium from this waste liquor, but according to the reports, in scarcely appreciable quantities. Its main magnesium product, Elektron metal, which has been described in previous issues of THE METAL INDUSTRY, is being widely advertised, but is said not to have convinced the consumer altogether of its advantages compared with other alloys available. Nevertheless, it seems to have displaced magnalium, the aluminum-magnesium alloy with from 5 to 15 per cent magnesium content.

Duralumin has, of course, made great headway and a number of special alloys of aluminum have been introduced including Silumin, the aluminum-silicon alloy of the Alpax type.

The aluminum industry in Germany is a result of the war, but bids fair to hold its place.

PIONEER BRASS MILLS

The leading article in this issue is a history of the development and growth, and a description of the present status of the Bridgeport Brass Company of Bridgeport, Conn. This company has attained its sixtieth birthday, an uncommonly old age for industrial organizations. It is fitting therefore, that this event should be celebrated as it is being done by that company, and that a story of its growth and service should be published.

The publication of this article is directly in line with the policy of THE METAL INDUSTRY, to record the growth of the brass industry. During the last twenty years we have described numerous mills, foundries and plating plants, and during the last two or three years, a series of articles has been running on the great brass plants of New England. In our issue of August, 1922, appeared the history of the American Brass Company of Waterbury, Conn., which was the result of a combination of plants, some dating back over one hundred years. In March, 1923, a description appeared of the Chase Metal Works, Waterbury, Conn., in which is included the Waterbury Manufacturing Company, founded in 1837. In August, 1923, was described, the Scovill Manufacturing Company, the oldest brass plant in America, founded in 1802.

The Bridgeport Brass Company though younger, belongs with the group of pioneers and its record is particularly interesting in that it has been a forerunner in many respects. It has been the first to develop a number of specialties in manufactured products, and its latest and most distinctive feature is that of being the first to adopt electric furnaces to replace pit fires for melting brass.

The Bridgeport Brass Company has had a long and honorable career. We are sure that we voice the sentiments of the entire brass trade when we extend birthday greetings, and wish it continued prosperity.

UNPREVENTABLE ACCIDENTS

The common classification of accidents is "preventable" or "unpreventable." The unpreventable accidents are supposed to be those which cannot be foretold or headed off by human agencies. For example, being struck by a bolt of lightning could be legitimately classed as an unpreventable accident. How far this term can be carried, is evidenced by an article in the National Safety News by L. D. Burlingame of the Browne & Sharpe Manufacturing Company. Mr. Burlingame lists a number of accidents which were termed "unpreventable" by the foreman under whom they occurred. Among these causes were the following: slipping and falling downstairs; cut by broken glass in the door; falling over handle of truck. Obviously all three of these were preventable accidents, and were easily avoided by the proper measures, such as, non-slip treads, hand rails, prompt repair of broken glass, use of wire glass, keeping trucks out of aisles and painting truck handles white.

According to the author's analysis safety measures can be divided into two parts, Safeguarding and Education. It is his opinion that only 15 per cent of the accidents are due to the absence of safety devices, while 85 per cent are in the main traceable to someone's carelessness. Methods of education must, of course, be intangible and for that reason difficult to state. They depend entirely upon the enthusiasm and sincerity of the management, and the efficiency with which this enthusiasm is translated into action. Special safety committees; special instructions for apprentices; frequent talks and lectures; bulletin board notices with frequent changes to keep up interest; the fixing of definite responsibility upon the foremen or special foremen; all of these are ways and means to instill into the worker the desire and interest in keeping the plant safe. In this way most "unpreventable" accidents will be prevented.

MOLDING SAND TESTING

Dr. H. Ries, Chairman of the Sub-Committee on Tests of the Joint Molding Sand Research Committee of the American Foundrymen's Association, presented a paper at the Glasgow Convention of the Institute of British Foundrymen, which stated clearly the present situation of the laboratory investigation of sands. This investigation has been one of the outstanding features of the work of the American Foundrymen's Association during the last three years. It is not a new idea, of course, but never until now has an organized attempt been made to standardize the methods of testing foundry sands.

Briefly stated, the reasons for this project are as follows:

1. To enable the consumer to determine the qualities of new sands and intelligently compare them with others already in use.
2. To permit the producer to keep a check on the uniformity of his product.
3. To make it possible for the consumer to check all shipments as received in order to determine whether they conform to his requirements and specifications.
4. To add another factor in the control of foundry operations.

Dr. Ries described the various types of tests which are covered in the series of articles on Tests for Molding Sand, now running in THE METAL INDUSTRY. It will be interesting and pleasing if European foundry associations take up this work and spread the use of sand testing methods.

NEW BOOKS

Transactions, American Foundrymen's Association, in two parts, I and II, Volume 32, 1925. Size 6 x 9 in. Prices, payable in advance: Part I, 789 pp., $6.00. Part II, 387 pp., $4.00. Sections of Part I: Apprenticeship, 38 pp., 50 cents; Nonferrous Foundry Practice, 254 pp., $2.00. For sale by THE METAL INDUSTRY.

Because of the extent of material presented at the Milwaukee meeting, the bound volume of Proceedings of the American Foundrymen's Association for 1924 has been published in two parts. Part I contains all papers and reports other than those on sand problems. It is composed of sections on apprentice training, non-ferrous castings, iron castings, steel and malleable castings; metallurgical and shop topics are included in each of these sections. The papers reproduced present the most valuable foundry data ever put out in the Association's Proceedings.

Part II is devoted exclusively to the papers and reports on sand research presented at the Milwaukee meetings, and in addition contains the report of the Joint Committee on Geological Surveys, covering the foundry sand resources of some ten states. The Geological Survey departments of these states co-operated with the committee by making the surveys and obtaining samples of the sands. The testing of the samples, numbering more than 700, was carried on at the U. S. Bureau of Standards, Cornell University and the University of Illinois.

As all the sands were tested under uniform conditions and by methods specified by the standards issued by the Joint Committee on Molding Sand Research, all these sands can be compared as to their various physical properties.

Proceedings of the American Society for Testing Materials. Published in two volumes, 1,173 pages and 1,133 pages. Price payable in advance, $6.00 per volume in paper; $6.50 per volume in cloth; $8.00 per volume in half leather. For sale by THE METAL INDUSTRY.

Part I (1173 pp.) contains the annual reports of 35 of the standing committees of the society, together with the discussion thereon at the annual meeting. They include reports of committees on Ferrous and Non-Ferrous Metals, Cement, Ceramic, Concrete, Gypsum, Lime, Preservative Coatings, Petroleum Products, Road Materials, Coal and Coke, Waterproofing Materials, Electrical Insulating Materials, Shipping Containers, Rubber Products, Textile Materials, Thermometers, Methods of Testing and Nomenclature and Definitions; 87 tentative standards which have either been revised or are published for the first time; annual address of the president and the annual report of the executive committee.

Part II (1133 pp.) contains 47 technical papers with discussion. These include valuable information on results of investigations by experts in the field of engineering materials. This part also includes a Symposium on Effect of Temperature upon the Properties of Metals and a Symposium on Corrosion-Resistant, Heat-Resistant and Electrical-Resistance Alloys. These Symposiums include valuable new and hitherto unpublished data.

TECHNICAL PAPERS

Hydrogen in Zinc Cathodes. By Oliver C. Ralston.*

A recent publication by Schwarz describes deposits of zinc which show concentric rings, indicating that the metal has been deposited in layers. The density of Schwarz's metal is 6.9, and on heating, large quantities of hydrogen are set free. The present author has observed, in his own work, that smooth cathodic deposits of zinc develop well-defined warts on the surface, some as large as 4 mm. in diameter, after the cathodes have been stored several months or years. Their formation is ascribed to the setting free of hydrogen gas, which had been originally co-deposited with the zinc. It is concluded that unless ways can be devised for preventing the presence of hydrogen in cathodic zinc deposits, the deposits may become defective during the course of a year or so by the above described wart formation.

The Properties of Pure Aluminum. By Junius David Edwards.*

Pure aluminum as made by the Hoopes process differs materially in its properties from aluminum made by the Hall process. The mechanical, chemical and electrical properties of this new product are discussed in detail. The tensile strength of pure aluminum is 600 kg. per sq. cm. as compared with 900 kg. for ordinary 99.4 per cent aluminum; the per cent elongation is 60 as against 45 per cent for ordinary aluminum. Pure aluminum is very resistant to corrosion: a sample of pure aluminum submerged in dilute hydrochloric acid showed no appreciable corrosion after six weeks' immersion.

The Electrolytic Refining of Aluminum. By Francis C. Frary.*

The new Hoopes cell for the refining of aluminum is described. There are three horizontal layers in this cell, the lowest is the liquid aluminum-copper alloy anode, above this is a layer of the fused cryolite-barium fluoride electrolyte, and floating on top of this is the cathode of pure molten aluminum. The cell operates at about 6 volts and 20,000 amperes. The cathode product analyses 99.8 per cent Al or higher, and is quite different in physical properties from ordinary 99 per cent aluminum. The new aluminum metal holds its bright luster in air almost indefinitely, and is only slowly soluble in dilute hydrochloric acid.

*Abstract of a paper presented at the meeting of the American Electrochemical Society, held in Niagara Falls, April 23, 24 and 25, 1925.

The Crystal Structure of Bismuth. By L. W. McKeehan.†

The work of previous investigators is checked by a method applicable to crystals of considerable complexity.

X-Ray Crystallometry. By L. W. McKeehan.†

A critical review of constants in X-ray crystallometry; X-ray wave lengths, space-lattice dimensions and atomic masses.

The Crystal Structures of the System Palladium-Hydrogen. By L. W. McKeehan.†

A study by means of X-ray crystallometry of the occulsion of hydrogen.

Permalloy. By H. D. Arnold and G. W. Elmen.†

A description of iron-nickel alloys with abnormal physical properties in weak magnetic fields, their theoretical and practical importance emphasized.

The Crystal Structures of Silver-Palladium, Silver, Gold and Iron-Nickel Alloys. By L. W. McKeehan.†

Two papers dealing with variations of crystal parameter with composition and probable causes of minor variations from linear changes.

The Art of Sealing Base Metals Through Glass. By William G. Houskeeper.†

A discussion of methods and types of seals showing that the effects of differences in expansion are made negligible by proper proportioning of the metallic members.

Photomicrography and Technical Microscopy. By Francis F. Lucas.†

A discussion of equipment and optical parts. The application of technical microscopy to the solution of definite engineering problems involving telephone apparatus.

The Scattering of Electrons by Metals. By C. Davisson and C. H. Kunsman.†

Two papers. The Scattering of Electrons by a positive Nucleus of Limited Field (theoretical). The Scattering of Low Speed Electrons by Platinum and Magnesium (experimental).

Photomicrographic Evidence of the Crystal Structure of Pure Cerium. By Earle E. Schumacher and Francis F. Lucas.†

A microscopic study of the crystal structure of cerium of a high degree of purity indicating that the metal crystallizes in the regular system, cubic form.

† Publications of the Bell Telephone Laboratories, New York.

SHOP PROBLEMS

IN THIS DEPARTMENT WE ANSWER QUESTIONS RELATING TO SHOP PRACTICE

BURNT BRASS FINISH

Q.—I am trying to produce a burnt brass finish on sheet brass rods that are stippled. These rods are curtain rods and are not round, but flat with a curved edge. I do not think we get the right color. I plate them with copper and then oxidize in a very weak solution and brush them with a fine wire wheel. This seems to produce a color like dull copper.

A.—Your method of producing the imitation burnt brass finish is one that is used to some extent and gives a good imitation finish. The furniture trimming manufacturers produce the basic finish direct, however, on the sheet brass surface as follows: In a receptacle of sufficient volume capacity, place 26° aqua ammonia; to the ammonia add sufficient golden sulphuret of antimony to produce a fairly dense solution. If possible use a regular acid earthenware jar with cover. Put the jar in a hot water tank to heat the solution. Immerse the sheet brass products in the ammonia-antimony dip until they are sufficiently colored to produce the burnt brass tone. Remove; wash in cold water; immerse in boiling water for a few minutes, then dry out and mottle with a soft buff to produce the variegated finish you desire. Then cleanse and lacquer as usual.—C. H. P. .Problem 3,409.

COLD NICKEL SOLUTION

Q.—Please give us a formula for cold nickel solution that will give a good deposit of metal in one half hour. Recently I made up a nickel bath using the following: single nickel salts 28 ozs.; sodium chloride 2 ozs.; boracic acid 2 ozs.; epsom sales 1 oz., but the part of the sheet steel facing the anodes came out with deep pits on them.

A.—To the nickel solution, add 2 ozs. sal-ammoniac and 2 ozs. nickel chloride and 1 oz. acetic acid per gallon. Heat to 100° F. or 110°. If pitting still continues, then to every 200 gallons of solution add 1⅓ lbs. of sodium perborate, dissolved in two gallons of hot water 120° F. When dissolved, add sufficient muriatic acid so that blue litmus paper turns only a violet or very faint pink tone. Add ½ gallon of the solution so prepared to 200 gallons of nickel solution and repeat at intervals until the pitting is eliminated. Only ½ gallon may be required or the full two gallons.—C. H. P. Problem 3,410.

CYANIDE ZINC SOLUTION

Q.—We would like to know if we could use potassium cyanide in making a zinc solution. How much zinc carbonate would be necessary to add to it? After this is made should we add caustic soda and sal ammoniac as the formula calls for? Would it be necessary to add sodium cyanide to make this solution plate in recesses of about an inch deep and an inch wide?

A.—We do not advise such a formula for cyanide zinc plating. Either of the following formulae will give you much better results:

SOLUTION No. 1. (Not patented)

Water	1 gal.	
Sodium cyanide 96-98%	4 ozs.	
Caustic soda 73-76%	4 ozs.	Temp. 120° F.
Zinc cyanide	4 ozs.	4 to 6 volts.
Magnesium sulphate	2 ozs.	

Anodes—Horsehead zinc.

SOLUTION No. 2. (Patented)

Water	1 gal.	
Sodium cyanide	4 ozs.	Temp. 120° F.
Caustic soda	4 ozs.	4 to 6 volts.
Zinc cyanide	4 ozs.	
Cyanobrite	1/15 oz.	

Anodes—Electrolytic zinc; 2% mercury or 98% zinc; 2% metallic mercury.

The unpatented solution gives a good commercial zinc deposit. To prepare the solutions, use one third of the water at 160° F. Dissolve the sodium and zinc cyanides, then add cold water to make up the balance whether one gallon or one hundred gallons, then the caustic soda, and the other materials mentioned.—C. H. P. Problem 3,411.

DISCOLORED BRASS

Q.—Kindly tell me the cause and cure of brass plate turning brown, black and streaked after leaving the solution for a few hours. Will say that when first taken from the tank it is of A-1 color, but soon discolors, as stated.

A.—Without seeing a sample of your brass plated product that discolors within a few hours after plating, we are unable to determine its cause at a distance. Does the brass turn color after lacquering?

We should infer that the solution is low in copper and sodium cyanide, and possibly a reducing agent. Try out a test solution on a 10 or 20 gallon basis with these additions to your present solution. Sodium cyanide 1½ ozs.; copper cyanide 1 oz., and bisulphite of soda 1 oz. per gallon. Dissolve the sodium and copper cyanide in as little hot water as possible for solution, add the bisulphite of soda last, directly to the solution. Before brass plating, if the articles are of steel or cast iron, coat them with a thin deposit of nickel. Let us know the results you obtain from these suggestions.—C. H. P. Problem 3,412.

GAS EVOLUTION

Q.—We are plating large steel tanks with cadmium and having trouble with the gas. The tanks are 50 sq. ft., amperes 500. I aim to carry 2 ozs. of cadmium and 5 ozs. cyanide. The metal got low, in fact so low that we put in all the cadmium anodes we could to keep it up. That was on a Saturday so I have not plated any since I put in caustic potash and licorice powder. The plate looks nice but the gas gets very bad as we work day and night to get out the demand. We have two tanks of about 425 gallons. We would like to know what would be the best way to get rid of the gas.

A.—We do not believe that in your particular case the gas rising from the cadmium solution you operate, is cyanogen gas, but hydrogen gas. The action of both gases is similar on the mucus membrane of the nose, etc., but hydrogen is not as harmful as cyanogen.

The addition of the caustic potash and licorice powder you mention, no doubt keeps down the cyanogen. Try adding 1 oz. ammonium sulphate per gallon of solution to lower the hydrogen. This is the only suggestion we can give you.—C. H. P. Problem 3,413.

HYDROGEN PEROXIDE

Q.—I have been using hydrogen peroxide in my nickel solution for some time. This works very well for a high class nickel finish. It stops all pitting and makes color buffing much easier. But it is very expensive for I have to use ½ oz. about every third day per gallon of solution. Would you furnish me with a method of preparing hydrogen peroxide from sodium perborate that would give me the same results and also be cheaper than to purchase?

A.—You can purchase sodium perborate from the manufacturers at prices ranging from 40 to 25 cents per lb. depending upon quantities. To prepare a solution of hydrogen peroxide equal in strength to the commercial product you have been buying, proceed as follows: In two gallons of warm water add 1⅓ lbs. of sodium perborate. When all dissolved, add pure hydrochloric acid until the acidity is about equal to the acidity of your nickel solution.

It is then ready for use. The two gallons so prepared will equal the strength of one gallon of the commercial hydrogen peroxide and should be added to your nickel solutions on the basis of ⅛ to 3/16 ozs. per gallon per day, to eliminate hydrogen pitting.—C. H. P. Problem 3,414.

NON-CORROSIVE BEARING

Q.—I am planning on the manufacture of an article in which both the shaft and bearing must be of non-corrosive metal running without oil but lubricated somewhat by water. That is, there will be water escaping through the bearing whenever the machine is in use. It has, however, only one revolution per minute and should last for many years. There are no bushings; no corrosive agent except water.

Will you kindly advise me what kind and composition of metal will be most likely to give the best service? Would a hard aluminum shaft running against a soft brass bearing be feasible?

A.—The alloy we would recommend for this job consists of 90 copper, 10 aluminum. This alloy is non-corrosive and acid resisting, strong and tough, and should last a long time.

We suggest only new metal be used in casting the shaft and bearing.—W. J. R. Problem 3,415.

PEELING NICKEL

Q.—I am having trouble with cleaning work for plating straight plumbing goods, red brass. I have tried various cleaners, soda ash and caustic soda, but find too heavy a tarnish on brass; also peeling.

A.—Try the following cleaning solution:

Water	1 gal.
Soda ash 58%	4 ozs.
Tri-sodium phosphate	4 ozs.
Solium cyanide	¼ oz.

Use this solution as a still or electro-cleaner. Peeling of nickel deposits, however, is not always due to the cleansing of the product. In nine times out of ten it can be traced to a hydrogen gas coating that develops upon the surface of the metal the moment the articles are placed in the bath. To your present nickel solution, which should be tried out on a 20-gallon basis, add per gallon, 12 ozs. epsom salts and 1 oz. acetic acid. Then to neutralize any possible hydrogen in solution, add 1/16 oz. sodium perborate. This material produces hydrogen peroxide in solution and in almost every instance will eliminate peeling. You can make an addition of the acetic acid and sodium perborate to your solution with excellent results.—C. H. P. Problem 3,416.

PLATING ALUMINUM

Q.—Kindly give me the necessary data on plating aluminum with a 30 per cent zinc content?

My copper solution contains: water, 1 gal.; sodium cyanide, 4⅓ ozs.; copper cyanide, 4 ozs.; bicarbonate of soda, ¾ oz.; bisulphite of soda, ½ oz. Nickel solution: water, 1 gal.; double nickel salts, ¾ lb. If I were to add 3 ozs. sodium citrate to the gallon, would it ruin my solution for my regular plating, which consists of brass and steel?

A.—It makes very little difference in nickel plating die castings whether the aluminum is high or low; 30 per cent zinc is low as compared with some die casting mixtures. Your nickel solution will have to be changed to nickel plate die castings successfully. The addition of 4 ozs. sodium citrate and 4 ozs. common salt to your nickel solution will enable you to plate the die castings successfully. The solution so changed will deposit nickel more freely on brass and steel surfaces, but otherwise no change will be noted. The addition of a little citric acid to the solution will be advisable, say, about 1/16 oz. per gallon. You can use hydrofluoric acid on the same basis to replace the citric acid if you so desire.

If you intend to copper strike the die castings first, your present copper solution may be too strong and result in blisters. Watch the deposit closely. It may be necessary to reduce the copper solution to half its strength with water or make up a small new solution specially for striking. Be careful in cleansing the die castings. Use mild cleaners, low in caustic so that the surface, when clean, does not become dark.

By following these suggestions, you should obtain satisfactory results. Use 5 to 6 volts at 10 to 20 amperes per square foot of surface, or less; time of plating, from 10 to 15 minutes; agitate the work plating rod in the nickel solution.—C. H. P. Problem 3,417.

RECLAIMING BABBITT CHIPS

Q.—Can you furnish us with a complete description of a method for reclaiming the babbitt machining chips removed from die cast connecting rods bearing with the following analysis: Tin 89%; antimony 7.3%; copper 3.7%.

A.—To reclaim babbitt chips it will be necessary to install the following:

First, if there are any iron chips around the department, where this material is machined, install a magnetic separator and run the chips through it to remove all the iron. Then install an iron kettle of about 3,000 lbs. capacity and melt a small amount of the chips down and get a bath of metal. Then add more chips from time to time, stirring them in the bath and flux the metal with sal ammoniac and resin mixed half and half. When the kettle is about full, boil the metal by inserting a green pole or raw potato to the bottom of the pot. This will refine the metal and remove the oxides.

Pour out in ingots at a temperature that will just char a pine stick and you will have recovered your chips in the ingot equal to the bearing as received.—W. J. R. Problem 3,418.

ROSE GOLD

Q.—What is a formula for rose gold? I tried the formula that you have in Platers' Wrinkles, viz.: hot water, 1 pint; muriatic acid, 1 pint; sulphate of copper, 4 ozs., but I could not get the dark surface that I desired.

A.—The smut you have tried out has given good results on brass as a basis for rose gold coloring. Try adding 4 ozs. sal ammoniac to the solution, which should then give you a satisfactory smut. If the base metal is high brass or gilding metal, it may be necessary to use a cyanide copper solution to give the smut. Prepare a solution as follows:

Water	1 gal.
Sodium cyanide 96-98%	3 ozs.
Copper carbonate	2 ozs.
Soda ash	2 ozs.

Use the solution cold with rolled copper anodes at 2 to 3 volts. Relieve the high lights after copper plating with bicarbonate of soda. To lighten up the copper before gold plating, immerse in a silver dip. Water 1 gallon; sodium cyanide 1 oz.; silver cyanide ¼ oz.—C. H. P. Problem 3,419.

SALT WATER GILDING

Q.—Will you please give me full information as to how to go about what they call salt water solution and what advantage it has over a 24 K. cyanide gold solution? Does it give better color and on what class of work is it used?

A.—A description of the formula used and method of equipment for salt water gilding will be found on pages 17 and 18 in Platers' Wrinkles. We believe regular electro gold solutions will be the best for you to use, especially if prepared from sodium gold cyanide. The use of small amounts of yellow prussiate of potash, ¼ oz. per gallon in a 24 K. gold solution, produces richer toned deposits.—C. H. P. Problem 3,420.

SILVER ON STAINLESS STEEL

Q.—How can I plate silver on stainless steel?

A.—Stainless steel should present no more difficulty in silver plating than ordinary steel. After cleansing and immersing the article in an acid dip composed of

Water	1 gal.
Sulphuric acid	12 ozs.
Common salt	4 ozs.

heat to 140° F. to plate for a few minutes in a nickel solution prepared as follows:

Water	1 gal.
Epsom salts	12 ozs.
Single nickel salts	12 ozs.
Boric acid	2 ozs.
Ammonium chloride	2 ozs.
Acetic acid	½ oz.

Temp. 80 to 100° F. Voltage 3 to 5.

After nickel plating, use the regular silver strike to coat the nickel over rapidly, then silver plate as usual.—C. H. P. Problem 3,421.

SOFT COPPER SOLUTION

Q.—Please publish a formula for soft copper cyanide solution, hot and cold for plating sheet steel. I am using a solution made up of sodium cyanide 4½ ozs.; copper cyanide 4 ozs.; caustic soda ½ oz.; bisulphite of soda ½ oz. at 120° F., but it seems to be hard to buff out 150 emery wheel marks from the polisher.

A.—Your present copper solution will give you satisfactory results with the following additions per gallon: sodium cyanide ¾ to 1 oz.; bisulphite of soda 1 oz.; hyposulphite of soda 1 to 2 ozs. per 100 gallons of solution.—C. H. P. Problem 3,422.

STICKY METAL CLEANER

Q.—You sent me a formula for a liquid metal cleaner and polish, as follows:

Oleic acid	6 lbs.
Gasoline	4 gal.
Carbon tetrachloride	3½ gals.
26° Ammonia	2 lbs.
Powdered silica	10 to 19 lbs.

This preparation cleans brass and copper in fine shape, but in polishing it off I find that it is gummy or sticky or does not rub off without considerable effort. Is there some special way this should be put together to avoid this stickiness?

A.—To slow up the drying with the possible elimination of the gummy effect of the cleaner, add kerosene oil. It may require only one quart to accomplish the purpose, or it may require more.

In preparing the cleaner, the oleic acid should first be dissolved in the gasoline and carbon tetrachloride; then the powdered silica should be added; finally the ammonia. Let us know the results you obtain from these additional suggestions.—C. H. P. Problem 3,423.

STRIPPING JAPAN

Q.—I am experimenting on a japan solvent and have tried many formulæ of my own, and none of which are very good. The following is the one I now use:

Sodium hydroxide	7 ozs.
Sodium carbonate	2½ ozs.
Rosin	½ oz.

making 10 ozs. of salts per gallon of water. It removes japan in about 2½ hours on cast iron and about ½ to ¾ of an hour on steel. I would like to have a formula which can remove japan at about 1 hour the most; if possible to remove japan within ½ hour, both on cast iron and steel. I want to use not more than 8 to 10 ozs. of salts per gallon if possible.

A.—It is possible to remove baked japans from cast iron or steel in 5 to 10 minutes by the aid of an electro-cleaner. Direct current, 8 to 10 volts. Heavy sheet steel as anodes. Temperature of solution not less than 140° F.

Water	1 gal.
Caustic soda 73-76%	6 ozs.
Soda ash 58%	3½ ozs.
Linseed oil soft soap	½ oz.

If it is desired to use a still solution, use 8 ozs. caustic soda, 1½ ozs. soda ash, ½ oz. linseed oil soap. Temp. 180° F. If you can arrange a mechanical vertical motion, up and down about ten movements per minutes, you should be able to remove the japan in one hour or less.—C. H. P. Problem 3,424.

TREATING ZINC BEFORE PAINTING

Q.—Can you tell us the best method of treating sheet zinc before painting to make the paint stick? We will use the sheet zinc for street signs and the letters will be drilled into the metal. For years we have used iron, electro-galvanized, and have never had trouble with making the coal tar paint stick for ten years or more. The same coal tar paint will be used for the solid zinc plates. At one time we experimented by dipping the zinc plate in a saturated solution of copper sulphate. This turned the sheet black, removed all grease and gave a good rough surface for the finishing coat. We are not sure whether this is the best and cheapest method and will be glad of any advice you can give or refer us to some authority.

A.—If you obtain a satisfactory basic surface on sheet zinc by immersing the zinc in a concentrated copper sulphate solution which results in a black surface to which coal tar paints will positively adhere, then in our opinion the method is as cheap as any method we can suggest, providing you purchase the copper sulphate at its minimum cost in large quantities.

Other methods that are used for a similar purpose are to immerse the sheet zinc in a solution prepared as follows:

Water	1 gal.
Caustic soda 73-76%	4 ozs.
White antimony oxide	¼ to ½ oz.

Temp. of solution, 120 to 140° F.

Water	1 gal.
Copper nitrate	16 ozs.

The U. S. Government recommends a dilute solution of copper chloride. Try the following:

Water	1 gal.
Copper chloride	4 ozs.
Muriatic acid	½ to 1 oz.

—C. H. P. Problem 3,425.

VERDE GREEN COPPER

Q.—How can we turn copper a greenish shade that will stand outside exposure?

A.—In "Platers' Wrinkles," on pages 21 and 22, under the heading Verde Green Solutions, you will find several formulæ that will give you a permanent green verde finish, which will stand outside exposure.

It is natural atmospheric conditions that have produced the natural verde green patina which we see on the statue of Liberty in New York Harbor.

Solution No. 3, under the heading of Verde Green, to apply with brush to copper, brass, bronze or oxidized surfaces, gives a very permanent finish. It is as follows: Hot water, 3 quarts; muriatic acid, 1 quart; verdigris, 3 lbs.; copper carbonate, 8 oz.; powdered white arsenic, 8 oz.; sal-ammoniac, 3 lbs.—C. H. P. Problem 3,426.

WHITE NAIL FILES

Q.—Will you be good enough to describe a process for obtaining a dead white lustrous finish for nail files? Tin plate gives a satisfactory whiteness, but has the disadvantage of being soft. At the present time we use a nickel plate which is the result of two hours' plate in a regular double and single nickel bath. This finish is also unsatisfactory, as it has a tendency to turn a brownish white color.

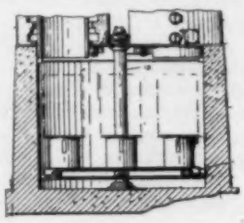
We understand that a process of immersing tin anodes in regular nickel solution produces a white coat upon steel or any other metal. Perhaps you could outline this process for us, or suggest some other method to obtain the desired white finish for our files.

A.—Tin does not reduce to any extent in a normal nickel solution. We do not believe its use would benefit your nickel deposit to any extent. We feel sure no whiter nickel deposit would result. We suggest that the following improved nickel solution be tried out. It produces a very white nickel deposit and much higher current densities can be used than with the regular double and single nickel salt solutions. Water, 1 gallon; magnesium sulphate, 12 ozs.; single nickel salts, 12 ozs.; boric acid, 1½ oz.; ammonium chloride, 2 ozs.; pure hydrochloric acid, 1/32 oz.; cadmium chloride, 5 grains. The magnesium metal dissolved out of the sulphate evidently has a whitening influence upon the nickel deposit. Some manicure file manufacturers use the following tin solution to produce a dead white deposit upon the files: water, 1 gallon; sodium stannate, 28 ozs.; stannous chloride, 2 ozs.; powdered white starch, ¼ oz. Temperature, 120° F. Anodes, either steel or tin. Voltage, 2 to 3.—C. H. P. Problem 3,427.

PATENTS

A REVIEW OF CURRENT PATENTS OF INTEREST

1,539,848. June 2, 1925. **Furnace.** Charles F. Kenworthy, Waterbury, Conn., assignor to Charles F. Kenworthy, Incorporated, Waterbury, Conn.



In combination, a furnace, a tank below the furnace, an elevator connected with the furnace, and means exterior to and adjacent to the top of the tank for effecting self-rotation of the elevator.

1,539,955. June 2, 1925. **Magnesium Extraction.** Brodde E. F. Rhodin, Caldwell, N. J.

The process of extracting magnesium from magnesium alloys which comprises treating such alloys in a bath of molten alkali having chemical affinity for the metal or metals with which the magnesium is alloyed and for which the magnesium has a natural chemical neutrality.

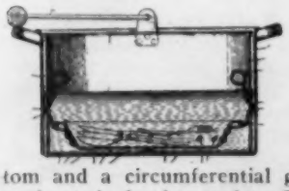
1,539,993. June 2, 1925. **Impression Metal.** Edwin J. Conley, New York, and George W. Mullen, Flushing, N. Y., assignors, by mesne assignments, to Lehmaier Schwartz & Co., Inc., New York, N. Y.

As a new article of manufacture, lead impression plates for electrotyping, having a surface thereof provided with a protective coating of lead bichromate.

1,540,006. June 2, 1925. **Metallic Alloy.** Frank S. Hodson, Philadelphia, Pa.

The method of making a metallic alloy which consists in first making a hardening alloy of approximately 51 parts aluminum, 49 parts copper, one part manganese and one-half part titanium; adding approximately 5 parts of the hardening alloy to approximately 12½ parts of molten aluminum, and adding this co-mixture to about 83 parts of molten zinc.

1,540,220. June 2, 1925. **Silver-Cleaning Apparatus.** Andrew W. Nelson, Terre Haute, Ind., assignor to Columbian Enameling & Stamping Company, Terre Haute, Ind.



In a metal cleaning apparatus, the combination of an outer vessel having a non-metallic surface, an inner vessel of smaller diameter fitting therein and having a perforated bottom and a circumferential groove in the side thereof and a perforated aluminum plate fitting into said groove by spring members attached to said plate.

1,540,354. June 2, 1925. **Electrolyte for Electroplating Metal with Tin.** Frank C. Mathers, Bloomington, Ind.

An electrolyte for electroplating with tin composed essentially of a solution of tin sulphate and cresylic acid sufficient in quantity to cause an electrolyte deposit of tin from the solution to be finely crystalline and smooth.

1,540,766. June 9, 1925. **Metal Process.** Samuel Daniels and Arthur C. Zimmerman, Dayton, Ohio, assignors to Thomas Rutmann, trustee, Dayton, Ohio.

A process for treatment of metals which comprises, coating the metal with a silicate and heating said coating to permanently affix it.

1,540,867. June 9, 1925. **Method of Treating Molten Magnesium.** Gustav Schreiber, Griesheim-on-the-Main, and Adolf Beck, assignors to Chemische Fabrik Griesheim Elektron, Frankfort-on-the-Main, Germany.

The method of protecting molten magnesium and its alloys against burning, comprising placing sulphur onto the surface of the molten metal.

1,540,928. June 9, 1925. **Acid-Resisting Alloy.** Alvah W. Clement, East Cleveland, Ohio, assignor, by mesne assignments, to William H. Smith, East Cleveland, Ohio.

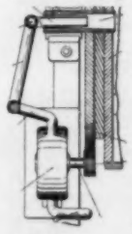
An alloy containing principally nickel, chromium and iron, in which the nickel is greater than 50 per cent, the chromium approximately 15 per cent, the balance consisting principally of iron together with an appreciable amount of molybdenum but not greater than approximately 8 per cent.

1,542,232. June 16, 1925. **Alloy.** Pierre Girin, Paris France, assignor to Societe Anonyme de Commentry, Fourchambault & Decazeville, Paris, France.

An alloy of the character described containing nickel 25 to 40 per cent, metal of the chromium group appreciably in excess of 8 and not more than 15 per cent, manganese 0.5 to 5 per cent, carbon 0.3 to 1 per cent and the remainder iron.

1,542,233. June 16, 1925. **Alloy.** Pierre Girin, Paris, France, assignor to Societe Anonyme de Commentry, Fourchambault & Decazeville, Paris, France.

An alloy of the character described containing nickel appreciably in excess of 20 per cent and not exceeding 40 per cent, chromium 10 per cent to 15 per cent, manganese 1 per cent to 5 per cent, carbon 0.2 per cent to 1 per cent, and iron the remainder, said alloy being heat-resistant and non-corrodible and having ductility and malleability adapting it for wire drawing and forging.



1,541,454. June 9, 1925. **Electroplating Machine.** William Watson Wells, Toronto, Ontario, Canada.

In an electroplating machine, the combination with the tank containing the electrolyte and the rotatable perforated drum containing the articles to be plated, of means for drawing off from the tank that portion of the electrolyte richest in metal and circulating it through the drum.

1,542,549. June 16, 1925. **Process for the Electrolytic Deposition of Metallic Chromium.** Richard Grah, Sheffield, England, assignor to Elecrom Limited, Sheffield, England.

A process of electrolytically depositing metallic chromium consisting in providing a bath containing a mixture of chromic oxide and a non-oxidizing acid in the proportions by weight of oxide of chromium more than half the weight of the acid, maintaining the relative proportions substantially constant during the operation, adding a suitable conducting acid which produces a non-colloidal solution, and maintaining the temperature constant.

1,542,598. June 16, 1925. **Means for Plugging Crucibles.** Edward F. Begtrup, Jersey City, N. J., assignor to Metal & Thermit Corporation, Chrome, N. J.

Means for plugging the tap-hole of a crucible containing hot molten metal, said means consisting of solid metallic material in calculated amount to insure melting thereof by the molten metal in a predetermined time.

1,542,664. June 16, 1925. **Method and Means for Soldering the Seams of Metallic Bodies.** Julius Brenzinger, Fairfield, Conn., assignor to The Max Ams Machine Company, Bridgeport, Conn., a corporation of New York.

The method of soldering the seam of a metallic body which consists in applying molten solder to said seam and at the same time subjecting the seam to the heating action of an electric current.

1,542,753. June 16, 1925. **Method of Welding Aluminum.** Spencer A. Wiltsie, Erie, Pa., assignor to Welda Ware Products Company, Erie, Pa., a corporation of Pennsylvania.

The method of welding aluminum which consists in heating the body of the metal locally adjacent to the weld from a source of heat delivered to one side of the material, and then raising the temperature of the metal thus preliminarily heated in a local area to a welding temperature with a gas flame.

1,543,237. June 23, 1925. **Process for Improving the Physical Properties of Electrolytically Deposited Copper Sheets.** Shingo Sonoda, Kyoto, Japan.

A process for improving the physical properties of an electrolytically deposited copper sheet comprising annealing the sheet at a temperature of from 300° C. to 800° C. for a duration of 5 minutes or more, rolling the same at a circumferential speed of not more than 450 feet per minute, and pickling the sheet with dilute sulphuric acid.

EQUIPMENT

NEW AND USEFUL DEVICES, MACHINERY AND SUPPLIES OF INTEREST

CLEVELAND ELECTRIC TRAMRAIL

In the large majority of cases in manufacturing plants, the problem of overcoming congestion, increasing production and reducing costs is a material handling problem. To solve this problem the Cleveland Electrical Tramrail Division of the Cleveland Crane and Engineering Company, Wickliffe, Ohio, has developed the Cleveland Tamrail, a material handling system and equipment that will enable it:

(1) To be overhead where it is out of the way.
(2) To lift and convey a load quickly and safely.
(3) To go wherever a hand or power truck can enter.

This new rail is made of a special analysis, high carbon steel,

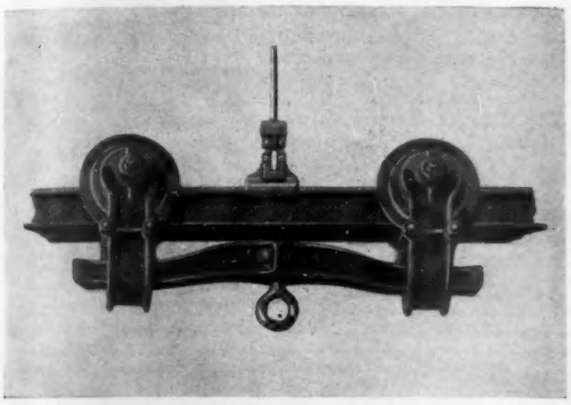


FIG. 1. HAND POWER CARRIER

and can be bent cold on the job to any necessary shape, even to a four foot radius. Next to the flexibility of the rail itself, the greatest advantage claimed for the Tramrail over other systems is the standardization of the rail fittings, switches, crossovers and carriers. Fittings for supporting the rail from concrete ceilings, various types of wood and steel roof supports, trusses and superstructures have all been standardized. Switches and crossovers are all of the sliding type and full ball bearing; carriers, also ball bearing, are made for both electric and hand power travel and hoist up to and including 4,000 pound capacity.

To the hand power carriers (Figure 1), can be hooked any make of chain hoist of their rated capacity, and special load bars have been designed for some makes of hoists which permit of attaching the hoists rigidly to the carrier. Electric carriers are designed for both single and variable speed control of both travel and hoist motor, and can be operated from the floor by either rope or push button operated controllers, or from a platform or open cage from indoor service or an inclosed weatherproof cage, for outdoor use.

The carriers are also operated on and over Tramrail cranes and transfer bridges which are made for hand power travel on the runway and for both hand and electric travel on the bridge. The transfer bridge is identical with the crane except for the addition of an interlock which permits the locking of the bridge while the carriers are being transferred. Hand power carriers can be operated over the same system as electric carriers without interference or changes.

FIG. 3. POURING METAL WITH HAND CARRIER

There is a complete line of jib cranes for use when trackage crosses over passage-ways, railroad tracks or driveways permitting the swinging of the jib, with the track attached, out of the way of any passing truck or train; a cage, (Figure 2), for washing steel sash windows of the modern factory building operating on the Tramrail track supported from either the eaves of the building or on brackets attached to the walls; paint dipping elevators, lifting beams, automatic elevators for operating from floor to floor, numerous type of box, bale, barrel and marble grabs, load platforms, roll paper handling attachments, drop bottom buckets and a hairpin hook, for the handling of bundles of rod or wire in the wire mills.

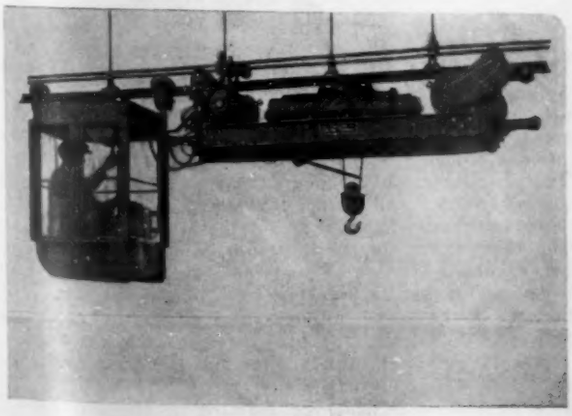


FIG. 2. JIB CRANE WITH CAGE

NEW PLATING OUTFIT

Hobart Brothers Company, of Troy, Ohio, has placed on the market a new plating outfit which is called the HB Plater. This unit is particularly adapted for handling small work in bulk. One distinctive feature of the equipment is that the motor generator set also operates the revolving barrel containing the moving cathode.

The illustration shows the compactness of the set. It is said to be dependable, efficient and long-lived.

HOBART PLATING OUTFIT

SAWING METALS

A step in the art of sawing metals has been made which, it is claimed, makes it possible to obtain double the output per hour from the machine, six to ten times the output per blade used, at one-half the cost per piece sawn. This is not obtained as the result of a single improvement but by a combination of three—

1st. The patent Rapidor hack saw blade, made of the finest high speed steel and having a patent set which allows it to be re-sharpened many more times than any other hack saw blade.

2nd. The patent Rapidor saw sharpening machine, which provides a simple and quick method of sharpening the Rapidor blade and particularly of ensuring that the teeth are ground to the most efficient angles.

3rd. The patent Rapidor sawing machine, a machine specially adapted to run at a high speed and under the severer conditions required to get the full benefit of high speed steel blades.

The diagram taken from an actual test, gives some idea of what results may be obtained. The blade was a high speed steel blade with the Rapidor patent set, running in a No. 1 Rapidor sawing machine at 170 strokes per minute and with a substantial pressure. It was sawing a bar of mild steel, 4 inches diameter.

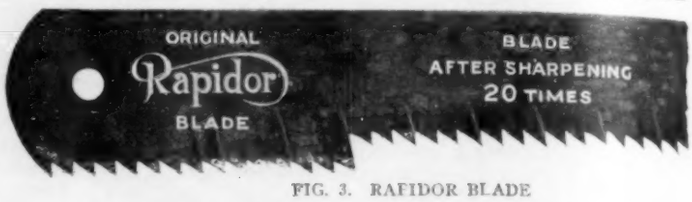


FIG. 3. RAPIDOR BLADE

The 282nd cut was made in 4¾ minutes, showing the extraordinary result that, contrary to all previous experience, the longer the blade lasts, the quicker it cuts.

The total was 367 cuts through a 4 inch mild steel bar with one blade, in the average time of 7 minutes per cut.

The Rapidor high speed steel blades are specially suited for sawing the harder materials which quickly wear out the ordinary blades, and very great advantages can also be shown when sawing brass, phosphor bronze and other alloys for which sharp teeth are absolutely necessary.

THE RAPIDOR SAW SHARPENING MACHINE

The Rapidor sharpening machine introduces a new method of sharpening hack saw blades, that is by grinding them exactly to models having the correct shape of teeth for quick cutting. The grinding wheel is stationary. The blade moves towards the wheel in contact with the models, and its teeth are ground always to the most efficient shape. The teeth are ground on both faces. A diamond rest is supplied and arranged to true the stone to the correct angle. The Rapidor sharpening machine will sharpen any size or make of hack saw blade with considerable advantage.

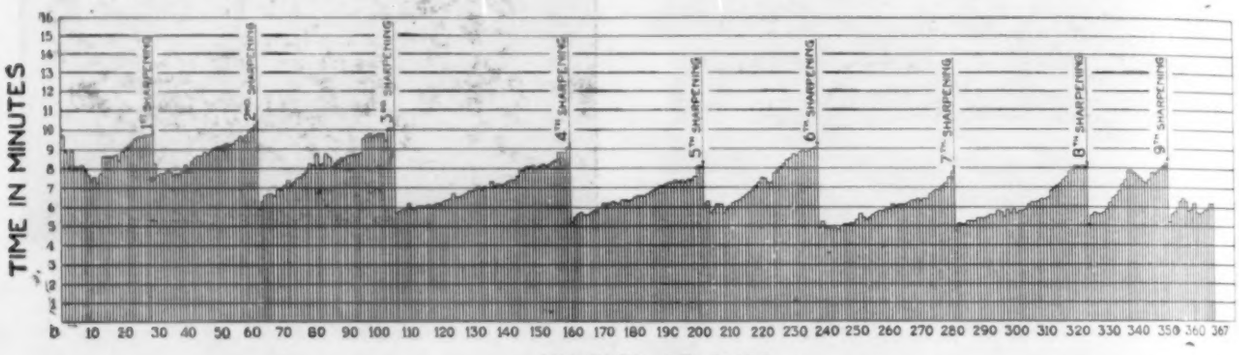


FIG. 1. DIAGRAM OF RAPIDOR CUTS

The first cut took 9¾ minutes with 5½ pressure, and this was reduced by the tenth cut to 7¼ minutes by increasing the pressure on the blade to 10. This comparatively slow start was due to the blade not being ground beforehand. After the first grinding the pressure was kept at 8 for the rest of the test. The diagram shows clearly the remarkable effect of sharpening. For instance—

The 105th cut was made in 10 minutes, and after sharpening, the 106th cut took only 5¾ minutes.

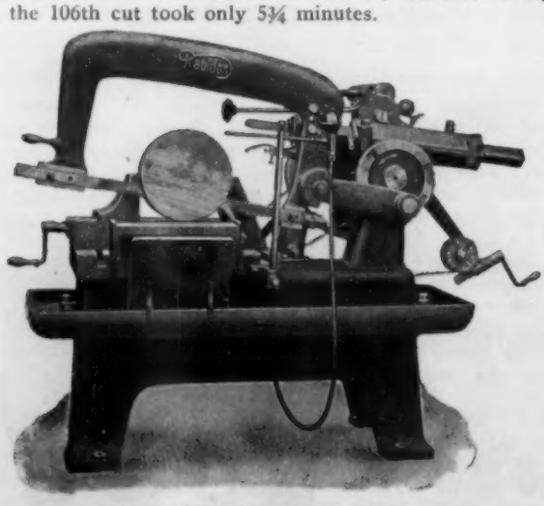


FIG. 2. RAPIDOR SAWING MACHINE

THE RAPIDOR SAWING MACHINE

The Rapidor sawing machines are made in two sizes—

No. 1.—Capacity 6 in. rounds or squares.

No. 2.—Capacity 10 in. rounds and other sections to 12 in. × 8 in.

These machines are suitable for running at a speed of 170 r.p.m. while putting a heavy pressure on the blade. The main shaft and crank pin are hardened and ground. They possess all the features of the rapid sawing machines, and in addition a complete system of mechanical lubrication is fitted.

The saw holders have an indicator to show when the saw blade is strained sufficiency, preventing breakage of blades through incorrect tension.

The dashpot, of improved design, is fitted with a device which enables a start to be made on a sharp corner or square bar without danger of breaking teeth out of the saw.

In spite of the heavy pressure involved, the fall of the saw frame can be controlled by one finger so as to cut a groove in the work before the full pressure on the blade comes into play.

This equipment is made by Edward G. Herbert, Limited, Chapel street, Levenshulme, England.

SPUR GEAR SPEED TRANSFORMER

The Hill Clutch Machine & Foundry Company, Cleveland, Ohio, have developed the "Industrial Type" Spur Gear Speed Transformer (Patent applied for), to meet the need for an efficient and durable speed changing device. This speed transformer consists of a nest of plain spur gears revolving in oil, changing the revolutions per minute of the input shaft to some desired revolutions per minute of the output shaft. The power transmitted is the same in both shafts. The gears all have 20° involute cut teeth. The short length of these teeth combined with their powerful cross section is said to insure great strength and reliability.

HILL CLUTCH

Of great importance is the central housing located in the main frame. With this construction it is possible to offer a gear transformer having both high and low speed shafts supported in double bronze bearings, insuring strength, rigidity and smooth operation. Ordinary thrust conditions have also been provided for.

Great accessibility is obtained as the cap and both ends can be quickly removed. The oiling arrangement is a continuous and thorough splash system lubrication obtained by a metal disc on the high speed shaft which automatically lubricaates every gear and bearing in the case. The entire unit is enclosed, dust proof and leak proof.

Both high and low speed shafts are in identical axial alignment. The action is positive and both shafts revolve in the same direction.

The "Industrial Type" Speed Transformer is made in seven sizes. Each size has a number which bears a fixed relation to the diameter of the low speed shaft. The number also indicates the horsepower the low speed is capable of safely transmitting at 100 r.p.m.

NEW WIRE ROPE

A basic change in wire rope construction is embodied in the new Tru-lay rope now being manufactured by the American Cable Company, New York. The new principle developed in the making of the rope is the "preforming" of wires and strands to the exact shape they must have to fit correctly in the completed product. The rope is being made in Lang and regular lays up to one inch in diameter.

An important characteristic claimed for Tru-lay rope is that it resists unstranding; it can be cut at any point for splicing and otherwise handled without the necessity of seizing. Tests are said to have shown that it has considerably longer life than ordinary rope under reversed bending stresses, an important asset where winding over sheaves and drums is a chief cause of wear.

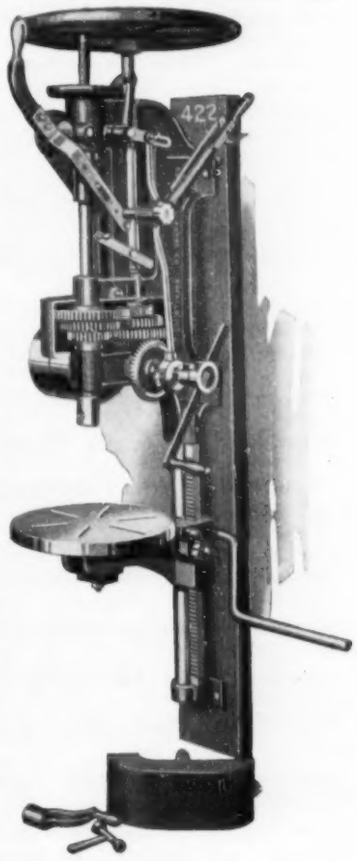
To make available practically the entire strength of the new rope, the American Cable Company has developed for it a special steel fitting, without zinc, called Tru-loc.

A steel sleeve is slipped over the smooth unseized end of the rope, placing in a specially designed press, and made to "flow" down upon the rope until it grips wires and strands. These sleeves may be of any reasonable length—can be threaded, can be equipped with heads of various types for wrenches, or furnished with eyes or hooks. The fitting is said to be lighter, less bulky and more dependable than the old-style zinc socket, probably because of the greater equalization of load on wires and strands.

Tru-lay rope is now being introduced in the oil fields, building and construction field, in the cement and quarrying fields and in a large variety of factory and shop operations, including elevation and crane operation.

IMPROVED CAPSTAN DRILLS

An improved method of gear engagement, which is claimed to be both positive and rapid, has been effected by the Buffalo Forge Company, of Buffalo, N. Y., in a series of capstan head drills, designated as No. 121, 124, 418, 421 and 322. The improvement here is an important one. With the old design, consisting of a simple collar and keyway, which engaged either of the two gears as desired, the collar was moved by hand. This method, however, was awkward, inconvenient, and a time loser.



IMPROVED CAPSTAN DRILL

The improved feature consists of a newly designed sleeve, placed directly behind the chuck, and a fulcrum lever. This sleeve is fabricated with a groove in which a yoke operates. By means of the lever, conveniently placed to the operator's hands, the sleeve controlling the gear engagement can be quickly moved into position desired. No gear guards of any kind need be removed.

These capstan head drills are either mounted on a heavy cast iron column, furnished with slotted base, or on a post. The drills have two speed, with the exception of Nos. 322 and 418, which have three speeds. The gear speed is controlled by means of the sliding sleeve described above. The feeds are both hand an automatic, and in case of the Nos. 418 and 421 drills, a ratchet lever feed is supplied in addition. The hand feed is obtained by planetary gears, rack and pinion operated by four arm levers. The automatic feed is obtained by turning the wheel on side of head to engage feed screw. There is a full and instant turn of the spindle after each operation by releasing the feed screw. Drills Nos. 121 and 124 can be equipped for direct motor drive if desired.

All drills of this series can be furnished with four step cone pulleys and countershaft if wanted.

Chief specifications follow:

	121	124	418	421	322
Drills holes up to...	1½"	1½"	1½"	1½"	1¼"
Drills holes to center of	21" Cir.	24" Cir.	18" Cir.	21" Cir.	22" Cir.
Dia. of spindle.....	1¼"	1¼"	1¼"	1¼"	1⅜"
Run of feed.....	7½"	7½"	4½"	4½"	17"
Run of table.....	17"	17"	18"	18"	17"
Size of pulleys.....	8" x 3"	8" x 3"	8" x 3"	8" x 3"	8" x 3"
Pulley speed.....	100-125 r. p. m.	100-125 r. p. m.	100-125 r. p. m.	100-125 r. p. m.	100-125 r. p. m

"SPEEDY HEAT" ELECTRIC FURNACE

Unusual results have recently been obtained with the improved "Speedy Heat" rotating electric furnace. It is stated that a heat of 600 pounds of red brass scrap has been poured in 40 minutes. One lining in a "Speedy Heat" rotating furnace is said to have shown over 2,000 heats service and is still operating. This gives a lining replacement cost of less than $.20 per ton of metal melted.

Another feature of general interest is the overload capacity, which on the 250-pound furnace has proved to be 470 pounds. A

heat of red brass scrap weighing this amount has recently been melted in one of the 250-pound furnaces. "Speedy Heat" rotating furnaces are built by the Booth Electric Furnace Company, 411 North Wells street, Chicago, Ill.

CONSULTING SERVICE IN ALUMINUM

Robert J. Anderson, Met.E., D.Sc., Consulting Metallurgical Enginer, offers a general consulting engineering service in the metallurgy, production, and application of aluminum and aluminum alloys. Complete advice may be obtained by manufacturers and users on all phases from raw materials to finished products. The variety of service offered is indicated below together with the type of problems which may be submitted for solution.

Advice and information on aluminum ores (bauxite), alloys, duralumin, electrical applications, fabrication and stamping, foundry practice, heat treatment, melting and furnaces, motor-car applications, permanent-mold work, rolling-mill practice, secondary metal and scrap, uses, etc.

Service covers development work, examinations, expert testimony and patent litigation, facts finding, investigations, management, opinions, organization, production, reports, research, surveys for financial interests, technical-control methods, tests, valuations, etc.

Dr. Anderson's address is 221 Amber street, E. E., Pittsburgh, Penna.

EQUIPMENT AND SUPPLY CATALOGS

Underfeed Stokers. Detroit Stoker Company, Detroit, Mich.

Fans and Blowers. American Blower Company, Detroit, Mich.

Grinding Wheel Stands, Etc. Norton Company, Worcester, Mass.

Switchboards. General Electric Company, Schenectady, N. Y.

Phono-Electric Wire and Phono-Hi-Strength Wire. Bridgeport, Conn.

Motor Driven Norton Grinder. Norton Company, Worcester, Mass.

Regrinding of Machine Knives. Norton Company, Worcester, Mass.

Heavy Duty Grinder. Hisey-Wolf Machine Company, Cincinnati, Ohio.

Grinding Wheel Information. Norton Company, Worcester, Mass.

Steel Plate Exhaust Fans. American Blower Company, Detroit, Mich.

Potentiometer Pyrometers. Leeds & Northrup Company, Philadelphia, Pa.

Crilly Mercury Anti-Friction Metal. Metal Sales Company, Jersey City, N. J.

Venturafin Method of Heating. American Blower Company, Detroit, Mich.

Controlling Seasonal Slumps. Metropolitan Life Insurance Company, New York.

Standardized-Machined Die Sets. Danly Machine Specialties, Inc., Chicago, Ill.

Training Key Men in Industry. Metropolitan Life Insurance Company, New York.

Building Laundry Business—Cleaners. Cowles Detergent Company, Cleveland, Ohio.

Precautions and Safe Practices. Oxweld Acetylene Company, Long Island City, N. Y.

Methods of Paying Factory Workers. Metropolitan Life Insurance Company, New York.

Answers to Questions about the Oxyacetylene Process. Air Reduction Sales Company, New York.

Aluminum, Copper Aluminum, Silicon Aluminum, Silicon Copper, Manganese Copper, Phosphor Copper, Copper-Nickel, Manganese Bronze. Leaflets from the Niagara Falls Smelting & Refining Corporation, Buffalo, N. Y.

ASSOCIATIONS and SOCIETIES

REPORTS OF THE CURRENT PROCEEDINGS OF THE VARIOUS ORGANIZATIONS

INTERNATIONAL FELLOWSHIP CLUB

HEADQUARTERS CARE OF J. C. OBERENDER, 185 CHURCH ST., NEW HAVEN, CONN.

Following up the discussion held at Milwaukee a year ago, a meeting of supply salesmen to the plating craft was held on June 28, 1925, at 8 p. m. at a dinner in the Mount Royal Hotel Montreal, Canada. As a result of this meeting an organization whose membership is composed exclusively of salesmen selling to the plating craft was formed. This organization will now be known as the International Fellowship Club.

The sole purpose of the organization is a social one and is not to be confused with any other association or organization in the plating craft. Meetings of the International Fellowship Club will give the supply salesmen a chance to "talk shop" with their fellow members in an atmosphere particularly adapted to the selling crowd.

In view of this all men engaged in selling to the plating craft should affiliate themselves with this body.

The next meeting is scheduled for a luncheon at 1 p. m. on the afternoon of Saturday, February 20, 1926 at the Aldine Club, New York City.

The following are charter members of the Club: Charles H. Proctor, Frank J. Clarke, R. H. Sliter, N. P. Hunter, C. J. Moyen, Thos. B. Haddow, Harry C. Flanigan, R. J. Hazucha, S. L. Cole, Frank Terrio, Thos. A. Trumbour, G. A. Tanner, W. G. Stoddard, B. Poppert, Wm. M. Schneider, Van Winkle Todd, John C. Oberender, Geo. J. Lawrence, Wilfred S. McKeon.

The following officers were elected. They will serve for a term of one year:

Chairman, Wilfred S. McKeon, Greensburg, Pa.

Vice-Chairman, Geo. E. Lawrence, 3727 Pine Grove Ave., Chicago, Ill.

Secretary, John C. Oberender, 185 Church St., New Haven, Conn.

CHEMICAL EQUIPMENT ASSOCIATION

HEADQUARTERS, 1328 BROADWAY, NEW YORK

The Board of Directors of the Association of Chemical Equipment Manufacturers, following the successful first Chemical Equipment Exposition in Providence, June 22-27, 1925, has instructed that through its proper officers an immediate survey of exposition building, exposition city, available date, etc., data be made, as applicable to a second Chemical Equipment Exposition under the management of the Association. Upon the basis of this data a determination of future Equipment Show activity is to be made within a short time.

With registered technical and industrial visitors' attendance of 1043 from 22 states, Canada, Italy and Czechoslavakia and with a range of exhibits covering the entire field of essential processing equipment and materials, the first Chemical Equipment Exposition was a pronounced success.

All told, 1573 persons directly interested in the processing industries and in chemical engineering's and chemical equipment's services and adaptations thereto, inspected or participated in the Exposition. The exclusion of the general public and confining of attendance to directly interested technical and industrial men resulted in uncounted favorable comments made to the Association or its representatives, by individuals among this attendance.

Personals

PHILIP UHL

Philip Uhl, a past Supreme President of the American Electro-Platers' Society and one of its most prominent members was born in Philadelphia, Pa., and attended the public schools in that city.

He entered the plating industry in 1880 with the Ledig Manufacturing Company, at a time when there were no generators and plating was done with acid batteries. This company was the largest manufacturer of all kinds of metal goods in Philadelphia. After serving his apprenticeship he was made foreman of the plating department. When this plant was destroyed by fire, he accepted a position with the Newall Booth Manufacturing Company, makers of all kinds of plumbers' supplies. He held this position twelve years, then spent two years with the A. & H. Lippincott Company.

PHILIP UHL

Since 1917 he has been with Robert M. Green & Sons, of Philadelphia, manufacturers of soda fountains and one of the oldest and best known houses in this line. The founder of this firm was the inventor of the now famous ice cream soda.

He is a charter member of the Philadelphia Branch, American Electro-Platers' Society and has been its secretary and treasurer since 1910. He was elected Supreme President at the Indianapolis Convention in 1921 and has served as a member of the Research Committee, working with the Bureau of Standards in Washington.

F. M. Hibben is now connected with the National Electrical Appliance Company, East 125th street, Cleveland, Ohio, having resigned from the Cleveland Armature Works of that city.

A. D. Merwin, formerly connected with the Steele & Johnson Manufacturing Company, of Waterbury, Conn., has joined the organization of the Bridgeport Brass Company as sales manager of the Fabricating Division.

W. F. Blythe has accepted the position of sales manager of the mill products division of the Bridgeport Brass Company, Bridgeport, Conn. Mr. Blythe was associated with the sales force of the American Brass Company for many years.

H. J. Davis has been made general manager of the Cleveland Armature Works, Cleveland, Ohio, following the resignation of F. M. Hibben. Mr. Davis was formerly secretary-treasurer of the above company. The Armature works makes grinding, buffing and polishing machines in addition to its other lines.

G. H. Clamer, president, Ajax Metal Company, Philadelphia, Pa., sailed on July 10th for Europe. Mr. Clamer is scheduled to deliver a paper to the Association Technique de Foundrie de France, but the postponment of that meeting until September will necessitate the paper being read in his absence, as he expects to return before the date of the meeting.

Arlington Bensel, vice-president and sales manager of the Driver-Harris Company, Harrison, N. J., has resigned to take up the sales engineering service of "Hybnickel" alloy products for Victor Hybinette, Wilmington, Del. Mr. Bensel is particularly well qualified to manage the sales end of the business, having been identified with the alloy field for twenty years.

Elmer W. Woodmansee, of Detroit, Mich., has joined the staff of the General Abrasive Company, Inc., Niagara Falls, N. Y., to sell and demonstrate Lionite, an artificial aluminous abrasive. Mr. Woodmansee has had many years' practical polishing experience, is a member of the American Electro-Platers' Society, and enjoys a wide circle of acquaintances among the metal polishing trade.

William J. Miskella, M.E., announces the opening of an office and laboratory at 1164 West 22nd street, Chicago, where he will specialize as a consulting engineer on lacquer, japan and enamel finishing problems. During the many years that he has been branch manager of the DeVilbiss Manufacturing Company, and president of the Lamberson Japanning Company, he has made a study of finishing in general.

Harry D. McKinney has been elected second vice-president and general sales manager of the Driver-Harris Company, Harrison, N. J. In 1918 Mr. McKinny joined the staff of Driver-Harris Company as district sales manager in New England territory and in 1920 was transferred to the Chicago sales office as manager. Mr. McKinny was at one time connected with the Westinghouse Electric & Manufacturing Company in various capacities in the shop and the sales department, handling a number of industrial applications including air compressors and machine tools.

Dr. Wheeler P. Davey of the Research Laboratory of the General Electric Company delivered a series of lectures on "Crystal Structure and Its Applications" at the summer session of the graduate school in the physics department of the University of Michigan. There were eight lectures, and eight conferences and laboratory periods in the weeks of July 6 and July 13. The laboratory work included use of a General Electric crystallographic equipment, by which crystal structure is determined through X-ray analysis. Dr. Davey conducted a course in this work at the graduate school of Pennsylvania State College last summer. **Professor George A. Lindsay** of the University of Michigan was in charge of the course on "X-Rays." He lectured during the first three and the final weeks of the eight weeks' course.

Obituaries

ROBERT HALL BEST

Robert Hall Best, the principal of Best & Lloyd, Ltd., manufacturers of high class chandeliers and electrical fittings, died on June 1st, in his 82nd year, at his residence, Handsworth, Birmingham, England. Mr. Best entered the business of his father at the age of 14 and very soon became a partner. Subsequently, the business became a limited company, with himself as chairman of the board. In 1905 he visited Germany with W. J. Davis, then secretary of the brassworkers, for the purpose of investigating the economic conditions of the brass trade, and the result was subsequently jointly published under the title of "The Brass Workers of Berlin and Birmingham—A Comparison." The pamphlet had a wide circulation, and was quoted in the House of Commons and the German Reichstag. His investigations completely removed the practice of depreciating the efficiency of German operations. One result was the establishment of important technical schools and classes, which have had a great effect in providing a better grade of intelligent and educated craftsmanship for practically all the Birmingham metal trades. For many years he was president of the Brassfounders Employers Association and worked ardently in various branches of social reform.

GEORGE J. BABCOCK

George J. Babcock, 74 years of age, formerly of Waterbury, Conn., the founder of the Waterville Cutlery Company, died at the home of his daughter, Mrs. William H. Weiss, of Hartford, May 27, 1925. He was born in Chicopee, Mass.; attended school there, and later studied in Boston. He started the Waterville Cutlery Company in 1878, bringing to it skilled workers from Sheffield, England, to teach the local employees the intricacies of the trade.

Many of these artisans are still working in Waterville and Waterbury. The company was dissolved in 1913, but during its existence was one of the best-known plants of its kind in the country.

Mr. Babcock was a 32nd degree Mason and a member of Sphinx Temple of Hartford. He leaves his wife, Emilie L. Babcock, and two daughters, Mrs. Weiss and Mrs. William A. Goodrich, of 6 Frederick street, Waterbury. The funeral was held May 29 from the Hartford home and burial was in the family plot in Chicopee, Mass.

WILLIAM P. BROWN

William P. Brown, a pioneer in the foundry and machine shop industry of Racine, Wis., died April 10, at the age of 75 years. In 1886 Mr. Brown founded the Davis & Brown Iron Works, later establishing the Racine Malleable & Wrought Iron Company. Mr. Brown retired from active business twelve years ago, after having conducted the Elgin Brass Foundry Company, Elgin, Ill., from 1908 until 1913, and resumed his residence in Racine, where he was born.

C. UPHAM ELY

As we go to press, we learn with deep regret of the death of C. Upham Ely, formerly head of the Ely Anode & Supply Company, 2 Rector street, New York City. Mr. Ely was one of the pioneer anode manufacturers in the United States.

NEWS OF THE INDUSTRY

BUSINESS REPORTS OF THE METAL INDUSTRY CORRESPONDENTS

NEW ENGLAND STATES

WATERBURY, CONN.

AUGUST 1, 1925.

Baker, Goodyear & Company of New Haven announced, last month, that ownership control of the **Waterbury Castings Company** on Railroad Hill has been secured by the interests which control the **J. L. Mott Iron Works** of Trenton, N. J., and the **Albany Malleable Iron Company** of Albany, N. Y. The purchase price is said to be in the neighborhood of $150,000.

The local concern was organized in 1907 with an authorized capital of $125,000. It established a reputation during the war for the manufacture of parts for Diesel engines. Since the death of **George E. Camp,** two years ago, who had acted as president and general manager of the concern from the time of its organization, **Ruth E. Camp** and a superintendent have managed the plant. The factory has a capacity of 40 tons of castings a day. Business depression affected the concern, however, and during the past year only 12 moulders have been regularly employed.

Following the transfer, the new stockholders held a meeting and elected new officers as follows: President, **A. A. Shumann;** treasurer, **Edward Dithridge;** secretary and general manager, **John Oliphant;** vice-president, **Frank E. Shumann.**

Waterbury manufacturers have declared their willingness to cooperate with the **United States Veterans' Bureau** and the **National Association of Manufacturers** in placing 25,000 wounded ex-soldiers in positions before next June, the veterans being those who have been rehabilitated by the bureau. The local factory heads have received requests from the bureau and the Manufacturers' Association asking about employment opportunities and have answered pledging cooperation.

Paul Langlois, recently discharged from his position as foreman at the **Connecticut Brass Foundry,** has sued the company for $5,000, alleging a breach of contract. His counsel, Attorney M. V. Blansfield, sets forth that Langlois and the company entered into a contract where Langlois was to be employed as a foreman by the company at $5,000 a year.

Irving H. Chase, president of the **Waterbury Clock Company,** was the first citizen of Waterbury to subscribe to the campaign now being conducted under state auspices to rehabilitate the Connecticut State Fair Association. Governor **John H. Trumbull,** Senator **Hiram Bingham** and Congressman **Schuyler Merritt** are officers of the committee which is refinancing the association through selling bonds. Mr. Chase purchased a $500 bond. The campaign is being managed by **Robert J. Eutace,** formerly secretary of the Waterbury Chamber of Commerce.

E. D. Goldsmith, whose home is in this city but who is now in charge of the California office of the **Scovill Manufacturing Company,** was the first member of the **Officers' Reserve Corps** in Connecticut to report to division headquarters in Hartford for the defense day test, July 4. He reported by mail from Los Angeles, giving an account of his actions on the day as required by the test, his report traveling over 3,000 miles.

The **Scovill Company Foremen's Associaton** held its annual outing at Champ's farm, Bridgeport, July 18. More than 200 were present. **Frank Wright** was chairman of the committee in charge; **Stanley T. Sunderland** was in charge of the sports program, the other members of the committee being: Joseph Loosier, **William McGowan, Joseph Brenneis,** Ward D. Hobbie, **Earl O'Dell, Herman Rehm, Edward Wolfe,** Henry Davidson and **Richard Minnaman.** A sparring bout between Charles **Williams** and **Morris Bennett,** and a baseball game between the single men captained by **Ivan Coulter** and the married men captained by **Amos Warren** featured the entertainment end of the program. Camera men of the National Film company took pictures of the outing for news film reviews.

While Waterbury is the only one of the larger Connecticut cities in which there is any amount of unemployment, according to the United States employment service, the condition is not serious. These temporarily released are absorbed in other lines but there is a surplus of common labor which is gradually decreasing.—W. R. B.

BRIDGEPORT, CONN.

AUGUST 1, 1925.

There may be the usual summer let-up in business but it is believed that the fall will show a healthy advance, according to **George S. Hawley,** president of the **Manufacturers' Association,** in a review of the first six months of 1925. May and June have shown increased business over the same months last year, he said. Records of the Bridgeport Gas Company show that 200 new families have moved into the city since April 15, he said.

The local plant of the **General Electric Company** reports that demand for its products during the first six months of 1925 has been greater than for the same period in 1924, according to **W. Stewart Clark,** manager of the plant.

The **Crane Company** is operating on as strong a schedule as last year. One-half of the plant is working full time and the remaining division is working on a five-day schedule. There are 1,500 men employed.

The **Remington Arms Company** is employing 3,000 men at about a normal scale of operations although it is slightly off tht season for their products. The company looks to good business this fall, according to Vice-President Jarvis Williams.

George M. Eames, manager of the **Singer Sewing Machine Company,** said he is well satisfied with business the first half of the year. It is about the same as the same period last year. He felt there will be steady employment the next six months.

The **Acme Shear Company** is running full time with a full force and expects to provide steady employment the next six

months with continued good business, **Dwight C. Wheeler** of the company said.

The **Bridgeport Brass Company** reports that business has been excellent this year and the prospects are good for continued good business. **Carl F. Dietz,** president, at a meeting of the Rotary Club at which the subject of savings banks was discussed, stated that if the capital originally invested in the Bridgeport Brass Company in 1865 had been placed in a savings bank with interest compounded semi-annually at present rates, the accumulation at the present day would be equal to the entire value of the holdings of the company. This statement followed a talk by **Richard Cogswell** on the advantage of regular, systematic saving and depositing in a savings bank.

Remington Arms Company has just completed an order for more than a million pocket knives for **William R. Wrigley, Jr.,** chewing gum magnate. The order is believed to be the largest single cutlery order ever placed. The knives will be used as premiums in exchange for wrappers. The manufacture of knives and other cutlery has been built up by the local plant wholly since the war so that the company now has the largest pocket cutlery business in the country. With the establishment of the **Challenge Cutlery Company** and the **Fly-Lock Company,** the city is now said to produce more of this type of cutlery than any other in the country.

The annual summer sales conference of the **Holmes and Edwards** division of the **International Silver Company** was held here July 1. Branch managers and salesmen from all sections of the country gathered here for the annual dinner and reunion. **Willard Brown,** oldest salesman, retired on a pension after completing 41 years on the road. Individual conferences were held at the factory with **J. T. Cunningham** of Cleveland, **E. M. Williams** of Brookline, Mass., **W. J. Hall** of Denver, **W. W. Browne** of Chicago, **S. F. Swain** of San Antonio, **George Hughes** of Chicago, **E. L. Perry** of Cleveland and **E. J. Greulich** of Bath, Maine, as speakers.

Machinery from the former **Columbia Graphophone Company** plant at Baltimore and Toronto is being moved to the Yost plant of the local Columbia company by the **Canadian-American Properties Company** which owns all three plants. The firm is planning to sell its real estate and physical property both in Bridgeport and the other two cities with the exception of the Yost plant here and will centralize its activities in this plant.

Bridgeport manufacturers are taking an active interest in the organization of the **New England Regional Advisory Board,** an association of shippers, receivers, bankers, etc. Romeo W. Miller, traffic manager of the **Crane Company,** is a member of the manufacturing company and **W. H. Pease** of the **Bridgeport Brass Company** is a member of the executive committee. **R. J. Davis** of the **Raybestos Company** and **E. L. Warner** of the **Locomobile Company** are on the automotive industry committee, while **Stanley H. Bullard** of the **Bullard Machine Company** is on the organization committee.

A total of $16,000 has been pledged for three consecutive years by the business groups of the city to pursue the work of the new **Industrial Bureau of the Chamber of Commerce. C. A. Willard,** assistant secretary of the Chamber, has been made secretary of the new bureau at a calary of $4,000. He will work part time in New York for the purpose of digging up prospective industries for this city.

The police commission has accepted the offer of the **Brigeport Brass Company** to install round brass plates instead of the painted white lines to mark the passage for pedestrians across streets, indicate intersecting streets and other traffic signs on the surface of the streets. The plates would be considerably more expensive but would endure as long as the pavement and would be cheaper than continually painting white lines in the long run, it is said.—W. R. B.

TORRINGTON, CONN.

August 1, 1925.

Announcement has been made of the marriage in St. Peter's Episcopal Church, Milford, on Saturday, July 11, of **George H. Atkins,** secretary of the **Torrington Employers' Association** and for many years affiliated with the **Turner & Seymour Manufacturing Company,** and **Mrs. Mary Miller,** also of Torrington. Mr. and Mrs. Atkins spent their honeymoon at Prospect Beach, West Haven, and are now residing on Litchfield street, Torrington. Mr. Atkins was at one time vice-president of the Turner & Seymour Company and is widely known in metal industry circles in New England. He is a former representative to the general assembly, an assessor, former deputy judge of the Torrington borough court, served as fuel administrator during the war and is prominent in many other phases of community activity. He is probably one of the best known citizens of Torrington. His bride was for several years housekeeper at the Atkins home following the death of Mr. Atkins' first wife. The couple have the best wishes of a host of friends for happiness and prosperity.

John J. Cassidy, former chief engineer and later general superintendent of the Trumbull-Vanderpoel plant at Bantam, has resigned his position as manager of the electrical department of the **Holzer** estate in New Orleans and has been visiting his family in Torrington.

The new addition to the plant of the **Torrington Manufacturing Company** is practically completed.

Many of the Torrington plants were closed down for from one to two weeks during July for the annual inventories and repairs.

Work is progressing on the erection of a big six-story addition to the plant of the **Eagle Lock Company** in Terryville. The building is to be 250 feet long and 65 feet wide.—J. H. T.

NEW BRITAIN, CONN.

August 1, 1925.

Mid-summer finds business in the various hardware manufacturing concerns in this city proceeding with accustomed energy, without visible signs of labor differences or of any general slackening up. While there has not been the stimulated briskness that was hoped for earlier in the year, nevertheless all of the big concerns here express themselves as satisfied with conditions which seem to indicate continued business with prospects of a good fall and winter.

Landers, Frary & Clark, manufacturers of electrical goods, cutlery and domestic hardware, continue to lead in its field and is especially busy in its electrical department. Of late this concern has turned out several new products which are highly successful. The **P. and F. Corbin Division** of the **American Hardware Corporation** finds a good demand for its door knobs, transom rods, locks, escutcheons and other articles used in the building business and at the **Russell & Erwin Division** the same is true, the lock business being very good. Machine screw products in quantity are being turned out at the **Corbin Screw Corporation** and the **Corbin Cabinet Lock Division** also in running on full schedule.

At the **North & Judd Manufacturing Company,** which recently purchased the **Traut & Hine Company,** a detailed policy for the recently acquired concern has not been given out but it is assumed that the plant will be an auxiliary of the main concern. The **Stanley Works** and the **Stanley Rule & Level Company,** makers of wrought steel butts and hinges and carpenters' tools respectively, are fairly busy.—H. R. J.

PROVIDENCE, R. I.

August 1, 1925.

As a whole the metal trades average up with any of the other industries as regards the amount of activity that prevails. Some of the lines, like those connected with the manufacturing jewelry industry, continue dull and work only about half time, but others, particularly those connected with the building trades have not been so busy in several years. Tool and machinery makers strike a happy medium. There is, however, a more decided optimism prevailing than has been seen in a long time and prospects appear good for a material improvement all along the line in the early fall, that is expected to continue throughout the winter.

The **Gorham Manufacturing Company** cast the heroic figure in bronze for the monument erected to the memory of the men from Providence who participated in the Spanish-Ameri-

can War, the Philippine insurrection and the Boxer uprising and rebellion in China, 1898-1902, which has just been erected in the mall on Exchange place, this city. It is a Kitson model of the "Hiker."

The importance of each person acquiring the safety habit was emphasized by **Henry D. Sharpe,** president and treasurer of the **Brown & Sharpe Manufacturing Company,** in an address recently before the foremen of that concern at the company's plant. Mr. Sharpe's talk took place at a meeting of the foremen, which had been called by the plant service committee of the Providence Safety Council. Arthur H. Banton, the works superintendent of the plant, presided at the meeting. Luther D. Burlingame, industrial superintendent, congratulated the committee on the reduction in the frequency and severity of accidents during the first part of this year as compared to 1924, but pointed out that through untiring efforts and enthusiastic co-operation further progress might be made. William A. Viall, secretary of the corporation, in addressing the workmen, pointed out to the committee that it was the humanitarian aspects of the safety movement that the management was primarily interested in—that it was more concerned over the safety and consequent happiness of the individual workman than in any monetary consideration involved.

The **Reliable Sheet Metal Works,** 831 Potters avenue, Providence, are conducted by **Harry Roy** and **Morris Blank,** according to their statement filed at the office of the city clerk.

The **Pawtucket Electro-Plating Company,** which recently removed to its new plant at 112 East avenue, Pawtucket, is now fully established with increased facilities.

George W. Carpenter, for a number of years previous to his retirement from active business, head of the **Rhode Island Nickel Plating Works,** died at his home in East Providence, June 26. Had he lived until the following Monday, June 29, he would have been 77 years old. Six years ago he underwent an operation and since that time had not been in the best of health, although he was confined to his bed only about five days. He learned the machinists' trade as a young man, but in 1879 he purchased a half interest in the Rhode Island Nickel Plating Works and a few years later took over the business which he continued to operate until about ten years ago when he sold the business and retired. He is survived by his widow, one son and two grand-children.

The **W. F. Quarters Company,** electroplaters, who have been located at 14 Blount street, this city, for the past 15 years, have removed their office and plant to new and larger quarters at 36 Garnet street, taking the factory space on the first floor formerly occupied by **Fessender & Company,** silversmiths, who have liquidated.

Woonsocket Electric Metal Plating Works has just completed an overhauling and improvement of its plant and materially increased its facilities at 546 River street, Woonsocket, so that it now has baths of all sizes for nickel, brass, copper, gold and silver work.—W. H. M.

MIDDLE ATLANTIC STATES

ROCHESTER, N. Y.

AUGUST 1, 1925

Mid-summer dullness prevails in almost all manufacturing plants of any importance in Rochester, but an exception to this condition may be made in the case of the **General Railway Signal Company,** whose Lincoln Park institution is unusually busy with contracts obtained late in the spring.

Some latent activity has been noted in some of the departments of the **Eastman Company,** at Kodak Park, and business in a general way is said to be running along in a satisfactory manner, all things considered, among the Kodak plants. New appliances in the photo industry has served to stimulate business, particularly in the metal-using departments.

Reports from the electro-plating establishments about the city are to the effect that while the industry is quiet, the past month has shown better cash results than a year ago. But few brass moulders are out of employment and electro-platers are said to be regularly employed at this time. An unusually large volume of new and extensive buildings are in course of construction in Rochester, and a spasm of remodeling is taking place in the downtown business section.

A feeling of genuine optimism prevails at the offices of the **Todd Protectograph Company** and the **Taylor Instrument Companies,** both of which are anticipating a sharp increase in operations early in the fall. The **North East Electric Company** is also under the influence of the promise of business improvement.

Both of the **Lisk Manufacturing Comppany's** plants at Canandaigua and Geneva have been operating very successfully this summer and are anticipating still better business in the fall.—G. B. E.

NEWARK, N. J.

AUGUST 1, 1925

Business is brisk at some of the metal industry plants here, while others complain of a falling off in orders. Fire last January practically put out of business the **Andrew O. Kiefer Company,** manufacturing jewelers, then at 8 Arlington street, Newark, with the result that Vice Chancellor Church appointed **Major John Drake** receiver to wind up all of its affairs.

The **High Tension Company,** of 239 Washington street, Jersey City, has been chartered with 12,500 shares of stock, 2,500 of which will have a par value of $100 each and the remaining 10,000 no par value. The company will manufacture high tension apparatus, X-ray machines, electro-medical equipment and other appliances. Edward B. Leahy, Union Hill, N. J., Charles Somanski and Austin L. Roberts, of Jersey City, are the incorporators.

The Board of Health has ordered **Superintendent** David W. **Blaine,** of the **General Refining Company,** to stop the noxious odors coming from the plant, located at Linden, N. J.

Newark concerns incorporated were: **Damascus** Chemical **Company,** chemicals, $10,000 capital; **Electrical Products Company,** electrical supplies, $125,000 capital; **Diamond** Battery **Corporation, Inc.,** batteries, 2,000 shares no par value; Newark **Pen Company,** manufacture pens.—C. A. L.

TRENTON, N. J.

AUGUST 1, 1925

The Interstate Commerce Commission has denied the petition of the **Trenton Smelting and Refining Company** for a rehearing of a freight rate complaint which the company won last year. The rehearing had been asked to secure a greater refund of excessive rates paid than was awarded by the commission in its original decision.

Three Trenton men connected with the **Jordan L. Mott Company** are at the head of the reorganized **Waterbury Castings Company,** of Waterbury, Conn., as a result of a stockholders' meeting. **A. A. Shuman** was elected president, **Edward Dithridge,** treasurer, and **John Oliphant,** secretary. **Frank E. Shuman,** son of the president, was elected vice-president of the new company. He is also general manager of the Albany Malleable Iron Company. Mr. Oliphant is general manager of the Waterbury concern. The new officers are also members of the board of directors. They hold a controlling interest in the plant which has a capacity of fifty tons daily. The president of the company, A. A. Shuman, is superintendent of the Mott plant here.—C. A. L.

PITTSBURGH, PA.

AUGUST 1, 1925.

Midsummer dullness prevails in the greater portion of the manufacturing industries. Industrial operations are at a somewhat lower rate, but still ahead of last year on the whole. Demand for jewelry is very light. Radio equipment trade is slow, while electrical equipment sales are on a large scale. Some good sized orders have been placed recently for electric safety devices on railroads, and an excellent business in that line is looked for this fall. Building operations continue at a good rate and demand for building materials is steady.—H. W. R.

MIDDLE WESTERN STATES

CLEVELAND, OHIO

AUGUST 1, 1925.

There is no noticeable change in employment conditions in the metal trades in Northern Ohio during the past month over what prevailed the two months previous. All foundries are running full time and business is normal.

About 100 additional workmen will be employed at the **Transue-Williams Steel Forging Corporation plant** at Alliance, Ohio, by the acquisition of the **Weldless Rolling Ring Company,** of Cleveland, following negotiations extending over several months. By the merger a new process of making ring and drive gears and other circular forgings has been acquired. **S. V. Hunnings,** former president of the Cleveland company is now engaged in organizing the new department of the Alliance concern. The products of the Transue-Williams firm has hitherto been confined to steel products, but the manufacture of other metal products will greatly extend their scope, officials declare.

Ohio metal trades men have learned that the **Hammond Brass** factory, at Hammond, Ind., which was destroyed by fire recently, is being replaced by a new plant on Summer boulevard in that city. The new plant will be much larger than the old one, which was located at Michigan and Hohman streets.

The success of the **Ohio Brass Company** of Mansfield in the electrical field is reflected in the rise of its stock on the Cleveland market. During the first two weeks in July the old stock rose 10 points, which brings it to 243. For the past two years the stock has been on the rise, and the past year has gone up 172½ points.—S. D. I.

INDIANAPOLIS, IND.

AUGUST 1, 1925

The **Supervalve Company** has been incorporated in Indianapolis with a capital stock of $25,000 to do a general foundry and machine shop business, specializing in valves. The incorporators are Irving M. Fauvre, Julian M. Fauvre and Paul T. Rochford.

The **Hammond Brass Works,** Hammond, Ind., whose plant recently was destroyed by fire, has purchased a new site on Summer street in Hammond, and has begun excavating for a new building.

Othniel Hitch, Indianapolis attorney, has been named receiver for the **Stevenson Gear Company.** He filed bond of $25,000. The receiver was authorized to negotiate loans not to exceed $5,000 to be used as working capital in operation of the plant. Suit was filed some time ago by William S. Frye, head of a transfer company.—E. B.

DETROIT, MICH.

AUGUST 1, 1925

The **Brass Weatherstrip Manufacturing Company** has been incorporated at Detroit with a capital stock of $40,000, for the purpose of dealing in metal castings, fittings and attachments of all kinds. The stockholders are Frank M. Hills, 8907 Mackinaw avenue, Detroit; Frank C. Neinas, Flint, and Arthur J. Gibson, Detroit.

Work has recently been started in Grand Rapids on an addition to the **Wolverine Brass Works.**

The price of copper and of manufactured copper goods is practically the same as before the war, in spite of the fact that labor is from 75 to 100 per cent higher, according to **W. H. Roberts,** of the **Roberts Brass Company,** Detroit. Overhead, he adds, has been cut beyond reason in many cases in a desperate endeavor to reduce expenses and show a profit, but while the volume in pounds or tonnage has increased, earnings have not been in proportion. He claims that many manufacturers have deliberately set their prices lower than actual cost in the endeavor to decrease their present costs by spreading it over a greater volume, this being a vain expectation in view of the fact that the real demand and ability of the market to absorb such greatly increased production has not materialized and simply does not exist. Disastrous market prices have resulted from such tactics.

Fire in the enamel dip room of the **Briggs Manufacturing Company** recently caused a loss of only about $10,000, but it gained such headway for a time that three fire alarms were sent in. Firemen were hampered by an explosion. After strenuous work they finally subdued the flames with no very serious consequences.

Funeral services for **Carl L. Brumme,** 58 years old, treasurer of the **Commonwealth Brass Corporation,** were held in Detroit recently. He was well known in the brass industry.

The **Marine City Motor Castings Company** has been organized at Marine City to take over the business of the **McLouth Industries,** it is announced. The general manager of the new concern is **George E. Kramer.**

It is announced that the **Wolverine Brass Company,** at Grand Rapids, has awarded a contract to **I. K. Parsons & Sons** for a one-story addition to its boiler house.

The Sta-Brite Plating Company has been incorporated at Detroit for the purpose of engaging in a general electroplating business. The owners are **Christian Girl** and **M. D. Harrison,** both of Detroit, and **J. J. Jennings,** of Grosse Pointe.

It is announced that **P. L. Barter,** vice-president, will succeed **Malcolm McCormick,** resigned, as sales manager of the replacement parts department of the **McCord Radiator & Manufacturing Company,** at Detroit.

The **Unique Brass Manufacturing Company,** Detroit, has increased its capital stock from $150,000 to $200,000.

Lou R. Smith has been appointed sales manager of the **Edmunds & Jones Corporation** at Detroit.

The **Burns Brass Foundry Company,** of Battle Creek, is erecting a new foundry unit in that city to care for an increase in its brass, aluminum and bronze business. The **H. B. Sherman Manufacturing Company,** also of Battle Creek, will erect a building to house a foundry and brass finishing shop.

The **Campbell, Wyant & Cannon Foundry Company,** at Muskegon Heights, Mich., is now employing 1,200 persons. Its management sees nothing but good business for an indefinite period.—F. J. H.

CHICAGO, ILL.

AUGUST 1, 1925.

A strong tone has marked the metal industry during the last month according to Chicago jobbers. This holds true, they say, in spite of the fact that buying has been less during the last week and that prices have shown no tendency to rise. Traders in Chicago point to the recent rise in London prices as a result of a better American market.

The float of the **Continental Can Company** was one of the attractive features of a giant parade opening Chicago's new South Parkway along the South shore, July 23rd. The float was made up a truck with trailer gorgeously decorated with flowers and bunting.

The **Raffel Manufacturing Company,** 4441 Armitage avenue, manufacturers of dies, tools, stampings, report an increased business in the last thirty days. The machines they manufacture are sold largely to leather works and the increase in business was sharp after the 1st of July.

C. Doering & Son, Inc., 1375-79 West Lake street, find total averages this month exceed those of July, 1924.

The **Chicago Metal Manufacturing Company,** 3724 South Rockwell street, have increased their output by twenty-five or thirty per cent by the addition of new machinery during the last sixty days. They are manufacturing several new sizes of pipes and elevator buckets. Several new members have joined the firm. Among them is **John C. Dasso,** sales manager, who has been with the **Robertson Brothers Manufacturing Company** for years.

The **Wheeling Corrugating Company,** 2547 Arthington street, finds that with prices as low as they are now, summer sales are unusually good.

Building conditions, which have been remarkably good in Chicago, have brought a general increase to the metal trade, it is reported.

The **Art Metal Products Company** reports good buying of radiator covers during July. This company is expanding and establishing agencies throughout the country.—L. H. G.

OTHER COUNTRIES

BIRMINGHAM, ENGLAND

JULY 17, 1925.

H. Donald Hope, presiding at the annual meeting of **Henry Hope & Sons, Ltd.,** Smethwick, Birmingham, said that metal windows had made a rapid advance in popular favor during recent years, but competition was keen all over the world, and some manufacturers were more active in cutting prices than in maintaining and improving quality.

The firm of **Allen Everitt & Sons, Ltd.,** one of the largest firms in Birmingham specializing on brass condenser tubes, condenser plates, stay rods, ferrules, etc., in naval brass and similar metals, have lately carried out extensive reorganizations with the object of speeding up output and cheapening production. A range of electrical furnaces has been installed, each of 2,000-lbs. capacity, with the object of superseding the old crucible, and obtaining metals free from contamination. At the same time, the large tube mill, one of the best equipped and most spacious in Great Britain, has been rebuilt and epuipped with the latest appliances, including overhead traveling cranes, replacing the old-fashioned forms of trolley transport. The mills are entirely electrically operated, and heat treating has been improved by the introduction of muffles, chain-fed instead of hand-fed. It has been found possible to reduce the manual labor and to speed up production. The demand for the company's cupro-nickel alloy is increasing and Germany is one of its best customers.

One of the effects of the reimposition of duties on watches and clocks which came into operation July 1st has been a very large importation. Some of these were brought over by aircraft, and a substantial proportion in an unfinished state. A natural effect of this has been a decided falling off in the orders for electro-plate, retailers having invested all their spare cash in clocks and watches during the favorable buying period. It is expected that the effect of this will be experienced at least until the autumn, and the electro-plate trade is decidedly quiet just now.

Manufacturers of metal buttons in Birmingham have found some revival of business through the increased popularity of this class of button. Decorative buttons are called for in large quantities in metal.

A recent exhibition of foreign samples of hardware held at the Birmingham Chamber of Commerce gave some encouragement to local manufacturers from the competitive point of view. The foreign goods were superior to some previously shown, but this was reflected in higher prices, and in many articles the Birmingham manufacturer believes that he can compete successfully. American tools were decidedly the best foreign articles shown, but in regard to these the British manufacturer sees no difficulty in maintaining effective competition. The goods shown included all classes of aluminum ware, edge tools, engineers' and joiners' tools, spades and shovels, locks and a good deal of dainty toilet ware. Aluminum domestic utensils are growing in favor, and are largely ousting cast iron hollow ware from the kitchen. In regard to a variety of goods one leading firm of Birmingham merchants has gone so far as to exclude foreign goods from its catalogues stating that they can sell successfully against foreign goods in such lines as garden spades and forks, aluminum hollow ware, enamel buckets, oil stoves, incandescent burners and several other articles. They state "the large majority of the lines are at the same price as foreign-made lines, and of course, are better quality. The few remaining lines that come out slightly dearer in price are, of course, made up for by their superior quality and we maintain therefore that all the lines are competitive with foreign-made goods."

Manufacturers of wire goods, chiefly coated with tin, are as busy as they can be, and in some instances are increasing their workshop accommodation and are putting in new machinery. The high temperature of an unusual summer has increased the demand for dish covers, meat containers and a variety of domestic utensils in wire. The production of fire guards is a sound industry in which the manufacturer has the advantage of a certain amount of government compulsion as a measure of safety.

Most of the Birmingham brass trades are busy. A number of the stampers produced speculatively in the early parts of the year such articles as linoleum, picture hooks and small stamped productions called for in the household and the sales have justified their enterprise. Improved machinery has enabled these to be produced more cheaply, and sales have been continuous and profitable. The movement in the substitution of copper tubes for lead for water conveyance continues to make satisfactory progress.—J. H.

Business Items—Verified

The **Anderson Chemical Company** has moved to 40 Rector street, New York.

Bridgman Company, 30th street, Philadelphia, Pa., is establishing a new branch at Reading, Pa., which will be opened in September.

New Haven Copper Company, New Haven, Conn., has become a member of the Copper & Brass Research Association, of New York.

Niagara Falls Smelting & Refining Corporation, Buffalo, N. Y., announces the opening of its new plant and office at 128 Lakeview avenue, Buffalo.

Silvers Manufacturing Company, Waterloo, Iowa, manufacturers of sanitary products, chemical closets, white enameled steel cabinets, etc., is putting up a two-story building.

W. H. Kemp Company of New York, one of the oldest metal manufacturers in the metropolitan district, has sold its aluminum business to Strahs Aluminum Company, also of New York.

Republic Flow Meters Company, Chicago, Ill., has opened a branch office at 535 Bramson building, Buffalo, N. Y. This office will be in charge of W. W. Barron, formerly of the Chicago office.

C. F. Verzier, gold and silver plater, has removed to 278 Pearl street, New York City. Mr. Verzier does hard and silver soldering for the trade, specializing in military ornaments and buttons.

William Victor & Son, silversmiths, are now located at 195 St. Nicholas avenue, New York. They manufacture a line of hotel and steamship silverware, and have a department for repairing and plating.

The **Ferro Enamel Supply Company,** Cleveland, Ohio, is installing a Bonnot Overhead Charging Fork and Double Unloader in the enameling plant of the Malleable Iron Range Company, Beaver Dam, Wisconsin.

Installation of a Norton alundum brick muffle in the enameling plant of the **Glenwood Range Company,** Taunton, Massachusetts, has just been completed; installation being made by the **Ferro Enamel Supply Company,** Cleveland, Ohio.

Scott Valve Manufacturing Company, Detroit, Mich., announces the appointment of H. P. Rodgers & Company, Leader-News building, Cleveland, Ohio, as the Cleveland representatives for the Scott line of bronze and iron valves.

Chase Companies, Inc., Waterbury, Conn., have removed the New York offices of the Chase Metal Works and the Waterbury Manufacturing Company, to 138 Lafayette street, New York City. Complete stocks will be carried at this address.

William Krodell Foundry, 1820 Baldwin street, Waterbury, Conn., is constructing a one-story foundry, for the manufacture of brass, bronze, aluminum and other castings. This firm operates the following departments; brass, bronze and aluminum foundry.

The **Ferro Enamel Supply Company,** Cleveland, Ohio, announces the addition of **Robert Roadhouse** to their service staff. Mr. Roadhouse for many years had charge of the enameling department of the Benjamin Electric plant at Des Plaines, Illinois.

A new bonnot overhead fork and American-type double unloader is being installed at the present time in the enameling plant of the **Rhinelander Refrigerator Company,** Rhinelander, Wisconsin. Installation is being made by the **Ferro Enamel Supply Company,** Cleveland, Ohio.

The **DeVilbiss Manufacturing Company,** Toledo, Ohio, has opened a Detroit sales and service branch at 4614 Woodward avenue. There will be carried at this branch, at all times, a display and stock of the complete DeVilbiss Spray-painting Equipment. Service men will also be on hand.

The **Evernu Lamp Manufacturing Corporation,** 1050 Metropolitan avenue, Brooklyn, N. Y., has been organized to manufacture bridge lamps and other metal specialties. This firm will operate the following departments: casting shop, spinning, plating, stamping, polishing, lacquering.

White Star Metal Spinning Company has taken over part of the building at 357 Bowery, New York City. This concern does spinning in all metals, specializing in large sizes, and does manufacturing for the trade. The following departments are operated: spinning, soldering, polishing.

An X-ray diffraction equipment, by which the crystal structure of matter can be investigated, has been presented to **Sir William Bragg** of the **Faraday Laboratory** of the **Royal Institute of Great Britain,** by the **General Electric Company.** Shipment of the apparatus was made this month. (July.)

William Cramp & Sons Ship & Engine Building Company, Richmond and Norris streets, Philadelphia, Pa., has decided to abandon plans for new works on a 25-acre tract at Bridge and Tulip streets, purchased during the war and has disposed of the property to Burton C. Simon, 1981 Sparks street, for $165,000.

The **International Silver Company,** Wallingford, Conn., has awarded contract to the Immick Company, Meriden, Conn., for a two-story 40 x 130 foot machine shop, to cost with equipment, $100,000. This firm operates the following departments: tool room, spinning, plating, rolling mill, stamping, polishing, lacquering.

Dempsey Furnace Company, Jersey City, N. J., has been consolidated with the W. N. Best Corporation, 11 Broadway, New York City. The combined furnace business of the two companies will be operated as the Dempsey Furnace Division of the W. N. Best Corporation under the personal direction of H. B. Dempsey.

The **Cleveland Graphite Bronze Company,** manufacturing bronze bearings at Cleveland, Ohio, has inaugurated a group life, health and accident insurance program, which enables its employees to obtain protection without a medical examination. The plan is underwritten by the Metropolitan Life Insurance Company of New York.

L. T. Sheffield, president and treasurer of the **New England Collapsible Tube Company,** manufacturing tin and lead tubes at New London, Conn., has signed contracts with the Metropolitan Life Insurance Company, which provides about 150 workers with group life insurance protection of approximately $110,000 in addition to group health and non-occupational accident benefits.

Muskegon Aluminum Foundry Company, Muskegon, Mich., will soon move into a new plant now being completed at Clay avenue and Eighth street, Muskegon, Mich. The building is one story, 80 x 140 feet, and is considerably larger than the present foundry. This firm operates the following departments: bronze, aluminum foundry; brass machine shop, plating, polishing.

The Boston plant of the **American Schaeffer & Budenberg Corporation,** formerly American Steam Gauge & Valve Manufacturing Company, is shortly to be moved to the plant of the Wright Machine Company, Grand Street Court, Worcester, Mass. This firm operates the following departments: brass, bronze and aluminum foundry; brass machine shop, tool room, plating, polishing.

W. A. Jones Foundry & Machine Company of Chicago, Ill., has appointed **F. S. Van Bergen** district sales manager for the Minneapolis territory. His address is 614 Builder's Exchange, Minneapolis, Minn. This office will handle the sales of the entire Jones line including speed reducers, friction clutches, gears, iron pulleys, flexible couplings, line shaft equipment and miscellaneous power transmission specialties.

The **Andrews Lead Company, Inc.,** 36 Greenpoint avenue, Long Island City, N. Y., has awarded a general contract to W. J. Bond, 511 Broadway, Brooklyn, for a three-story addition, 60 x 100 feet, for the manufacture of all kinds of lead products. This firm operates the following departments: machine shop and tool room, hydraulic machine shop, casting shop, spinning, rolling mill, soldering, oxide plant.

Ernest V. Squier and **Edwin F. Clemett** have been appointed sales agents in Detroit, and the state of Michigan for **Greasalt Products Corporation of New York.** Their offices are in the First National Bank building, Detroit. They carry warehouse stock in Detroit of the various Greasalt cleaning compounds, namely: metal cleaners, platers' cleaners, enamel and paint removers, floor, wall, laundry, dairy and general cleaners.

Wittenberg Manufacturing Company, 60-66 Shipman street, Newark, N. J., recently incorporated, will manufacture electrical equipment, including insulating joints, brass pull chain, connectors, etc. It will use a large amount of small malleable castings on which it will receive quotations in the next few weeks. E. H. Wittenberg heads the company. The following departments are operated: brass, bronze foundry; stamping.

The **Bridgeport Brass Company,** Bridgeport, Conn., has appointed **E. F. Keating Company,** 452 Water street, New York City, to handle the sale of Plumrite Brass Pipe in the Metropolitan district. This new company is known as the **E. F. Keating Pipe Bending and Supply Company.** This company manufactures and sells coils, bends, heaters and pipe pressure power plant piping, hot water service heaters and many other things along this same line.

French Manufacturing Company, Robbins street & Grandview avenue, Waterbury, Conn., manufacturer of bronze, aluminum, brass and copper tubing, has awarded a general contract to the Torrington Building Company, Torrington, Conn., for a one-story addition to cost approximately $250,000 with machinery. It will be equipped to give employment to about 250 operatives, doubling the present capacity. Frederick W. French is president.

Metals Coating Company of New York, Inc., 32-34 Penn street, Brooklyn, N. Y., announces that this company has completed organization, and is now prepared to supply devices, (including the Schoop spray), for applying to any surface, protective or decorative coatings of aluminum, zinc, tin, lead, or any of the commercial metals, by leasing the necessary appliances or doing such work on its own premises. Arnold Von Schrenk is president, and William W. Niles, vice-president.

STANDARD SAMPLES

New Bureau of Standards Standard Samples of Manganese Metal No. 67 and Ferro Manganese No. 68 are now being issued with provisional certificates. The manganese metal contains 97.2% Manganese, .06% Carbon, 1.50% Iron and small amounts of vanadium, chronium, and other metals; the Ferro-Manganese contains 80.70% Manganese, 6.85% carbon and small amounts of other metals. The price of each sample is $2.50 per 100 grams, prepaid or Parcel Post C. O. D.

SILVER IN MERCURY

The discovery of a metal in quicksilver closely resembling silver in its chemical composition was announced by Professor Miethe, German scientist, of Berlin, German. The quantities of supposed silver extracted exceed that of gold. He used an ultra violet ray lamp, which he previously employed in extracting gold from mercury.—New York Journal of Commerce.

ICED ALUMINUM HEELS

Aluminum shoe trees, hollowed in the center and filled with ice, will soon be seen in London as a superior luxury for the stylish man. It was all thought out by a bright young peer, who discovered he couldn't dance three dances one evening without an extreme fatigue.

Iced shoes are expected to make dancing all night in hot weather nothing but pleasure.—New York Times.

DENTAL AMALGAM ALLOY

The Bureau of Standards, Washington, D. C., has given attention to the problems encountered in securing a satisfactory alloy for dental restorations. Tests on ultimate compressional strength, flow under continued pressure, and dimensional changes upon hardening have been made. While the sterength of an aged amalgam may equal that of steel when crushed quickly (as intimated by some), it is by no means similar to steel in resistance to continued pressure. All amalgams tested show continued flow when subjected to a continued pressure of only one-tenth the average quick crushing load. This means that more care must be taken in designing restorations, attachments, contact points, etc., than would be necessary if the material were similar to steel.

Dimensional change tests show slight expansions for some alloys when amalgamated and allowed to harden. Other alloys show shrinkage upon hardening. This shrinkage, which takes place during and after the insertion of the filling, is very unfortunate for both the patient and the dentist. The former does not receive the service he has a right to expect from the restoration and the latter has had his skill nullified by a defective material.

The bureau is assisting the Federal Specifications Board in the preparation of a specification for dental amalgams which will eliminate such defective materials from Government purchases.

CANADIAN ALUMINUM PLANT

One of the most important industrial developments in the history of the Dominion of Canada is expected to be the outcome of the deal recently announced between James B. Duke and the Aluminum Company of America.

The Aluminum Company announced July 23, through The Associated Press, that the corporation would construct an extensive plant on the Saguenay river, near Quebec, but that the present organization would be undisturbed.

Whether the aluminum to be produced at the Saguenay plant will be for export to countries other than the United States, or whether United States requirements alone will be supplied from this plant, is not known. There is at present a duty against the import of aluminum into the United States, but there is a reasonable possibility of its removal.—NEW YORK TIMES.

STANDARDIZATION PROGRESS

The movement for greater standardization in industry has made substantial headway in the past year and promises to save all major industries many millions of dollars in addition to the large sums already saved, according to the report of the American Engineering Standards Committee.

The committee's year book shows that sixty-eight standards already have been approved, and work on about 100 other projects is actively under way. A wide range of activities is represented in the technical projects, which include 14 in non-ferrous metals.

Typical of the projects under way are codes for unification of specifications for zinc coating of iron and steel, and safety codes directly interesting nearly thirty different industries.

ZINC CONSUMPTION FOR GALVANIZING

The American Bureau of Metal Statistics estimates the total zinc consumption in the United States in March for galvanizing sheets and tubes at 12,740 tons, against 13,508 tons in February and 16,765 tons in January. In March, 1924, consumption was 12,835 tons. Of the total consumption last March in galvanizing these two products, 9,740 tons were used on sheets and 3,000 tons on tubes.

The consumption of zinc for galvanized sheets in Great Britain in January was 11,606 tons against 8,162 tons in January, 1924, and 8,512 tons in January, 1923.

ABRASIVES IN 1924

The production in 1924 of natural abrasives was about 190,000 short tons, valued at nearly $4,000,000 as reported by the Department of the Interior from a statement prepared by the Geological Survey. In addition there were manufactured in 1924 more than 60,000 tons of artificial abrasives, valued at $6,213,740.

GRAPHITE INDUSTRY IN MADAGASCAR

Conditions in the Madagascar graphite industry have shown a decided improvement since 1923, as a result of better market conditions, brought about partly by the official graphite commission set up by the Governor General of Madagascar. To this commission was given the propaganda in favor of the extension of the use of Madagascar graphites, and advertisement was conducted extensively in the United States and Germany.

The Madagascar authorities report that the acceptance of graphite on the market has been greatly increased through official investigations, which are said to have established its value for crucible manufacture as equal to that of the Ceylon graphite. Meanwhile, new deposits have been opened for exploitation, and facilities have been improved for transportation to the coast, so that it is expected that in 1925 graphite exports to America and Germany will continue to show an appreciable increase. Post-war stocks are used up and current demand must be met from production. Exports in 1923 totaled 10,767 tons, but rose to 11,556 the following year. This increase is more significant from the fact that prices have steadily risen from 700 to 800 francs per ton f. o. b. Tamative at the beginning of 1923 to present quotations of 1,300 to 1,400.—Commerce Reports.

ALUMINUM COMPANY STOCK

The stockholders of the Aluminum Company of America will vote on Sept. 9 upon a proposition to increase the capital stock of the company. They will also pass upon a proposed bond issue, an issue of preferred stock and the conversion of all or any capital stock now outstanding into stock of different par value. The stock of this company recently sold at $875 a share. It is a Mellon concern and closely held.

The company may absorb the Canadian Manufacturing and development Company.

INCORPORATIONS

J. E. Morgan has organized the **Woodbridge Fire Brick Company,** at Woodbridge, N. J., and has been elected president of the company. Mr. Morgan was formerly Philadelphia manager for the Harbison-Walker Refractories Company, and later with the General Refractories Company.

National Pipe Products Corporation, Rochester, Pa., has been organized with $25,000 capital stock to manufacture iron, steel and brass nipples, bent pipe, etc. It will operate its own plant and is in the market for steel pipe of the smaller sizes. A. Blackstone is general manager.

Die Cast Art Bronze Corporation, Jamestown, N. Y., has been incorporated to succeed the **General Metalsmiths, Inc.** The Die Cast company has purchased the plant formerly occupied by the General Metalsmiths, Inc., manufacturing white metal castings. The firm also has the jobbing rights for this territory for Udylite, and does some job plating work. The officers of the company are A. H. Riehl, president and general manager; M. O. Doolittle, secretary and treasurer. This company operates the following departments: casting shop, plating, soldering, polishing, lacquering.

METAL STOCK MARKET QUOTATIONS

	Par	Bid	Asked
Aluminum Company of America...	$100	$890	$930
American Hardware Corporation...	100	90	93
Anaconda Copper	50	42	42½
Bristol Brass	25	6	8
International Nickel, com.....	25	29½	30
International Nickel, pfd.....	100	98½	99
International Silver, com.....	100	165	..
International Silver, pfd.....	100	107	..
National Enameling & Stamping...	100	31	32½
National Lead Company, com.....	100	152	153
National Lead Company, pfd.....	100	118	119½
New Jersey Zinc.....	100	190	195
Rome Brass & Copper.....	100	135	150
Scovil Manufacturing Company.....	..	220	230
Yale & Towne Mfg. Company, new	..	67½	70

Corrected by J. K. Rice, Jr., Co., 36 Wall street, New York.

GOLD FOR TUBERCULOSIS

Gold treatent of tuberculosis was the subject of interesting evidence given in July to the Conference of the National Association for the Prevention of Tuberculosis by its discoverer, Professor Mollgaard of Copenhagen, and other specialists who have used it. Professor Mollgaard addressed the meeting and emphasized the fact that the treatment must be considered as only a beginning. Experiments had saved lives that were very gravely affected by tuberculosis and had brought them to a condition of clinical healing, he said. It was, however, not a treatment to be handed out for general use as yet, he said.—New York Times.

Review of the Wrought Metal Business

Written for The Metal Industry by J. J. WHITEHEAD, President of the Whitehead Metal Products Company of New York, Inc.

AUGUST 1, 1925.

Considerable improvement was noted during the month of July. Increases in the price of ingot copper had the effect of raising the published prices on the fabricated materials and it appears that a sufficient amount of tonnage has been placed to make everyone feel fairly comfortable. A better mental condition seems to prevail among those responsible for the operation of the mills and there seems to be less of a disposition shown to continue the price cutting campaign which has been going on for so many months. Practically all the mills report that they are extremely busy in most departments and that they are getting a better range of prices than has been possible for some time. The various industries consuming quantities of brass and copper are all in fairly flourishing condition, notably the building and electrical trades as well as the automobile and other industries.

As heretofore noted, the campaign against corrosion which has been given publicity for a long time past has had a material effect in increasing the consumption of practically all the metals in the non-ferrous group, and of these metals brass and copper have received their share of attention and consideration, and have been adopted in many new applications. In addition to this there are constantly being brought out new alloys of copper, zinc, nickel and other metals as the result of intensive research work in the effort to provide the proper combination of materials to meet varying conditions.

The producers and manufacturers of pure nickel and its alloys such as nickel silver and Monel metal continue to enjoy satisfactory business and report also that the uses for their products are constantly being broadened. The nickel silver manufacturers report that they are enjoying full order books and that their deliveries are now very slow. Probably the greatest proportionate increase in consumption of the white metals is found in pure nickel. It is only recently that pure nickel has been made available by manufacturers in this country in the forms of sheets, rods, tubes and wire and since this has been accomplished there has been a wide demand for this metal.

Taking the industry as a whole, it can be said that there is more ground for optimism now than there has been for a considerable time past and manufacturers are looking forward to the future with much confidence.

Metal Market Review

Written for The Metal Industry by METAL MAN

COPPER

AUGUST 1, 1925.

The market for copper was decidedly active and considerably firmer in July than for many weeks previous. Trading at higher prices was stimulated by reason of the statistics showing a sharp decrease in refined stocks during the second quarter of 1925. The reduction in refined stocks during this period amounted to 62,044,000 pounds, thereby bringing surplus supplies of refined in first hands down to 182,652,000 pounds, the smallest carryover since the close of the World War.

Deliveries of copper to domestic and foreign buyers reached the sensational level of 1,420,264,000 pounds for the first six months of this year, as against an output of 1,330,048,000 pounds for same months in 1924. The best buying is for domestic account at steadily advancing prices from 13¾c at beginning of July up to 14⅜c at end of month. There was also active buying for European shipment. Tone of market as we close this report is rather quiet but steady at 14¼@14⅜c. A cautious tendency is apparent owing to talk of a coal strike both here and in England. There are strong hopes that this eventually will not occur.

TIN

Good American buying and active speculative interest in London stimulated the market for tin recently. The remarkable strength of the situation and continued good demand gave the market an upward trend in July which enabled sellers to realize as high as 58⅞c for nearby Straits. Prices fluctuated between this figure and 56¾c for July deliveries, but spot Straits being in scarce supply commanded a premium.

There is tangible statistical evidence that consumption is on the increase. With such a strong position and decided expansion in demand trade sentiment has turned definitely optimistic. A prolonged coal strike in England and America would undoubtedly create depression, but otherwise the outlook is favorable. Market closes 57½@67.65 for August-September.

ZINC

Consumers have been doing more buying recently and the market has developed a firmer tone. Foreign buyers were also more eager and considerable export business was booked in the last half of July. European buyers are taking both slab and ore zinc on a good scale. American consumers have covered early requirements to a fair extent, but a larger buying movement is expected to develop for September and October shipments. Present prices for Prime Western Zinc are quoted at 7.62½c New York and 7.27½c East St. Louis basis. Stocks held by domestic smelters on June 30, 1925, amounted to 22,906 tons, against 49,684 tons held on June 30, 1924.

LEAD

Actual consumption at a high rate, a healthy statistical position and good demand are the contributing factors to a firm market. A stronger tone developed in both the domestic and foreign markets last month. Cable makers are using up heavy tonnages regularly, and other consumers have given strong support to the market through their numerous inquiries. The leading producer advanced prices twice last month. Price of American Smelting & Refining Co. is 8.20c at New York, but quotation on outside market is 8.50@8.65c. Stocks are light, consumption good and outlook favorable for active demand over the next three months.

ANTIMONY

A considerable volume of business was transacted in July for shipment from China. The scarcity of spot supplies helped holders to realize firm prices for future shipments. Unsettled conditions in China enabled sellers to exercise a

firm control on all positions. Buyers, however, are cautious in anticipating requirements for forward shipments on basis of current quotations. Prompt delivery quotes 16½@17c duty paid for 99 per cent regulars. August-September shipments from China might be had at 15⅝@15⅞c, but demand is limited for this position.

ALUMINUM

The situation in aluminum is a particularly strong one. Prices are maintained at 28c for 99 per cent Virgin metal and at 27c for 98-99 per cent grade. Demand is in good volume.

Large quantities are being taken by the automobile industry, and consumers generally are absorbing regular shipments of both domestic and imported material. The leading domestic producer is said to be constructing huge works in Canada for enlarging the output of aluminum. The new project is considered an important one, and will mean the investment of an enormous amount of new capital.

QUICKSILVER

The market for quicksilver has been comparatively firm lately at $83@$83.50 for 75 pound flasks. Imports are not excessive and the article being in control abroad, there is no apparent accumulation of stocks to act as a handicap on the market.

PLATINUM

There is no special activity to note in platinum, and the official price for refined remains at $120 per ounce. Trade demand is limited and inquiries are subject to special negotiation.

SILVER

Movements in silver continue on an important scale. Prices, however, show a decidedly steady tone and do not reflect the radical changes of former priods. Exports of the white metal for the fiscal year ended June 30, 1925, amounted to $108,823,344. Imports for same period were $71,606,388. The shipments to India have been large. World demand for coinage requirements and non-coinage needs has been calculated at more than production. But with a possible recent falling in consumption by the Far East a temporary increase in stocks is not unlikely. Present New York price is 69½c per ounce.

OLD METALS

Consumers have been more active buyers of the copper scraps since the market for the new metal has advanced. Old brass and coppr is moving more freely, although buyers show caution at the firmer quotations. Dealers and refiners are in the market for round tonnages of heavy copper and wire whenever prices are considered right. Heavy copper quotes 11½@11¾c, light scrap 9¼@9½c, new brass clippings 9@9½c, heavy brass 7@7¼c, battery lead 4¼@4½c, heavy lead 7@7¼c old zinc scrap 4¼@4½c and aluminum clippings 21½@22c.

WATERBURY AVERAGE

Lake Copper—Average for 1924, 13,419—January, 1925, 15.125—February, 15.00—March, 14.375—April, 13.625—May, 13.625—June, 13.75—July, 14.25.

Brass Mill Zinc—Average for 1924, 7.10—January, 1925, 8.00—February, 8.00—March, 8.10—April, 7.60—May, 7.55—June, 7.55—July, 7.80.

Daily Metal Prices for the Month of July, 1925

Record of Daily, Highest, Lowest and Average

	1	2	3	6	7	8	9	10	13	14	15	16	17
Copper (f. o. b. Ref.) c/lb. Duty Free													
Lake (Delivered)	13.875	13.875	14.00	14.00	14.00	14.125	14.25	14.25	14.25	14.375	14.375	14.50	14.50
Electrolytic	13.65	13.75	13.85	13.80	13.80	13.90	14.00	14.00	14.00	14.05	14.15	14.20	14.25
Casting	13.25	13.25	13.30	13.25	13.30	13.375	13.50	13.50	13.50	13.50	13.50	13.625	13.625
Zinc (f. o. b. St. L.) c/lb. Duty 1¼c/lb													
Prime Western	7.025	7.05	7.05	7.10	7.15	7.15	7.20	7.175	7.175	7.20	7.20	7.175	7.225
Brass Special	7.10	7.15	7.15	7.20	7.25	7.25	7.30	7.30	7.30	7.325	7.325	7.325	7.35
Tin (f. o. b. N. Y.) c/lb. Duty Free													
Straits	57.25	57.25	57.25	57.375	57.50	57.75	57.875	57.50	57.75	58.375	58.00	57.875	58.375
Pig 99%	55.50	55.50	55.75	55.625	55.625	56.25	56.50	56.25	56.50	57.00	56.75	56.875	57.25
Lead (f. o. b. St. L.) c/lb. Duty 2¼c/lb	7.70	7.70	7.75	7.85	7.95	8.05	8.10	8.10	8.10	8.10	8.10	8.10	8.05
Aluminum c/lb. Duty 5c/lb.	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00
Nickel c/lb. Duty 3c/lb.													
Ingot	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00
Shot	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00
Electrolytic	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00
Antimony (J. & Ch.) c/lb. Duty 2c/lb.	17.00	17.75	18.00	18.50	19.00	19.00	19.00	19.50	19.50	19.50	17.25	17.00	16.625
Silver c/oz. Troy Duty Free	69.125	69.375	69.375	68.875	69.25	69.625	69.375	69.375	69.375	69.50	69.625	69.625	69.375
Platinum $/oz. Troy Duty Free	120	120	120	120	120	120	120	120	120	120	120	120	120

	20	21	22	23	24	27	28	29	30	31	High	Low	Aver.
Copper (f. o. b. Ref.) c/lb. Duty Free													
Lake (Delivered)	14.60	14.60	14.60	14.60	14.50	14.50	14.50	14.50	14.50	14.50	14.60	13.875	14.338
Electrolytic	14.25	14.25	14.25	14.25	14.20	14.15	14.15	14.15	14.20	14.25	14.25	13.65	14.065
Casting	13.70	13.70	13.70	13.70	13.70	13.625	13.70	13.70	13.70	13.80	13.86	13.25	13.543
Zinc (f. o. b. St. L.) c/lb. Duty 1¼c/lb.													
Prime Western	7.275	7.275	7.35	7.325	7.275	7.275	7.30	7.375	7.35	7.60	7.40	7.025	7.221
Brass Special	7.375	7.40	7.45	7.425	7.40	7.40	7.45	7.475	7.45	7.50	7.50	7.10	7.333
Tin (f. o. b. N. Y.) c/lb. Duty Free													
Straits	58.625	58.50	59.00	58.75	58.00	57.75	58.375	58.75	58.50	59.375	59.375	57.25	58.076
Pig 99%	57.50	57.375	57.75	57.75	56.75	56.50	56.875	57.25	57.00	58.00	58.00	55.50	56.707
Lead (f. o. b. St. L.) c/lb. Duty 2¼c/lb	8.20	8.15	8.25	8.40	8.40	8.40	8.45	8.65	8.70	8.70	8.70	7.70	8.372
Aluminum c/lb. Duty 5c/lb.	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00
Nickel c/lb. Duty 3c/lb.													
Ingot	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00
Shot	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00
Electrolytic	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00
Antimony (J. & Ch.) c/lb. Duty 2c/lb.	16.50	16.50	16.75	16.75	16.875	17.00	17.25	17.50	17.50	17.625	19.50	16.50	17.734
Silver c/oz. Troy Duty Free	69.50	69.625	69.625	69.625	69.50	69.50	69.375	69.50	69.625	69.625	69.625	68.875	69.451
Platinum $/oz. Troy Duty Free	120	120	120	120	120	120	1120	120	120	120	120	120	120

Metal Prices, August 3, 1925

Copper: Lake, 14.625. Electrolytic, 14.30. Casting, 13.80.
Zinc: Prime Western, 7.45. Brass Special, 7.55.
Tin: Straits, 59.125. Pig, 99%, 57.875.
Lead: 8.95. **Aluminum,** 28.00. **Antimony,** 17.75.
Nickel: Ingot, 34.00. Shot, 35.00. Electrolytic, International Nickel Company, 38.00.
Quicksilver, flask, 75 lbs., $83.50. **Silver,** oz., Troy, 69.625. **Platinum,** oz. Troy, $120.00. **Gold,** oz. Troy, $20.67.

Metal Prices, August 3, 1925

INGOT METALS AND ALLOYS

Brass Ingots, Yellow	10¾to11½
Brass Ingots, Red	11½to12¼
Bronze Ingots	12 to13
Bismuth	$2.65to$2.70
Cadmium	60
Casting Aluminum Alloys	21 to24
Cobalt—97% pure	$2.50to$2.60
Manganese Bronze Castings	22 to40
Manganese Bronze Ingots	12 to16
Manganese Bronze Forging	34 to42
Manganese Copper, 30%	28 to45
Parsons Manganese Bronze Ingots	18¼to19¾
Phosphor Bronze	24 to30
Phosphor Copper, guaranteed 15%	19½to22½
Phosphor Copper, guaranteed 10%	18½to21½
Phosphor Tin, guaranteed 5%	65 to70
Phosphor Tin, no guarantee	65 to75
Silicon Copper, 10% ....according to quantity	28 to35

OLD METALS

Buying Prices		Selling Prices
12¼to12½	Heavy Cut Copper	13¼to13¾
12 to12¼	Copper Wire	13 to13½
10¼to10½	Light Copper	11½to12
9¼to 9½	Heavy Machine Comp	10¾to11¼
7¾to 8	Heavy Brass	8¾to 9¼
6¾to 7	Light Brass	8 to 8¼
8¼to 8¾	No. 1 Yellow Brass Turnings	9¾to10
8½to 9	No. 1 Comp. Turnings	10 to10½
8 to 8¼	Heavy Lead	8¾to 9
4¾to 5	Zinc Scrap	5¾to 6
10	Scrap Aluminum Turnings	12 to14
16 to17	Scrap Aluminum, cast alloyed	18 to19
20	Scrap Aluminum, sheet (new)	23 to25
32	No. 1 Pewter	36 to38
12	Old Nickel anodes	14
18	Old Nickel	20

BRASS MATERIAL—MILL SHIPMENTS

In effect Aug. 3, 1925

To customers who buy 5,000 lbs. or more in one order.

	Net base per lb.		
	High Brass	Low Brass	Bronze
Sheet	$0.18⅞	$0.20⅝	$0.22⅝
Wire	.19⅜	.21⅛	.23⅛
Rod	.16⅝	.21⅜	.23⅛
Brazed tubing	.26⅞	.....	.32⅜
Open seam tubing	.26⅞	.....	.32⅜
Angles and channels	.29⅞	.....	.35⅜

To customers who buy less than 5,000 lbs. in one order.

	Net base per lb.		
	High Brass	Low Brass	Bronze
Sheet	$0.19⅞	$0.21⅝	$0.23⅝
Wire	.20⅜	.22⅛	.24⅛
Rod	.17⅝	.22⅜	.24⅜
Brazed tubing	.27⅞	.....	.33⅜
Open seam tubing	.27⅞	.....	.33⅜
Angles and channels	.30⅞	.....	.36⅜

SEAMLESS TUBING

Brass, 23½c. to 24½c.
Copper, 24½c. to 25½c.

TOBIN BRONZE AND MUNTZ METAL

Tobin Bronze Rod	20⅞c. net base
Muntz or Yellow Metal Sheathing (14"x48")	18⅞c. net base
Muntz or Yellow Rectangular sheet other Sheathing	19⅞c. net base
Muntz or Yellow Metal Rod	16⅞c. net base

Above are for 100 lbs. or more in one order.

COPPER SHEET

Mill shipments (hot rolled)	21½c. to 22½c. net base
From stock	22½c. to 23½c. net base

BARE COPPER WIRE—CARLOAD LOTS

16¾c. to 17c. net base.

SOLDERING COPPERS

300 lbs. and over in one order	21 c. net base
100 lbs. to 200 lbs. in one order	22½c. net base

ZINC SHEET

Duty, sheet, 15%	Cents per lb.
Carload lots, standard sizes and gauges, at mill, less 8 per cent discount	10.25 basis
Casks, jobbers' price	11.50 net base
Open Casks, jobbers' price	12.00 to 12.25 net base

ALUMINUM SHEET AND COIL

Aluminum sheet, 18 ga., base price	40c.
Aluminum coils, 24 ga., base price	36.70c.
Foreign	40c.

NICKEL SILVER (NICKELENE)

Net Base Prices

Grade "A" Nickel Silver Sheet Metal

10% Quality	26½c.
15% "	28 c.
18% "	29 c.

Nickel Silver Wire and Rod

10% "	29½c.
15% "	33 c.
18% "	36 c.

MONEL METAL

Shot	32
Blocks	32
Hot Rolled Rods (base)	40
Cold Drawn Rods (base)	48
Hot Rolled Sheets (base)	42

BLOCK TIN SHEET AND BRITANNIA METAL

Block Tin Sheet—18" wide or less. No. 26 B. & S. Gauge or thicker, 100 lbs. or more, 10c. over Pig Tin. 50 to 100 lbs., 15c. over 25 to 50 lbs., 17c. over, less than 25 lbs., 25c. over.

No. 1 Britannia—18" wide or less. No. 26 B. & S. Gauge or thicker, 500 lbs. or over, 8c. over N. Y. tin price; 100 lbs. to 500 lbs., 10c. over Pig Tin. 50 to 100 lbs., 15c. over, 25 to 50 lbs., 20c. over, less than 25 lbs. 25c. over. Above prices f. o. b. mill.

SILVER SHEET

Rolled silver anodes .999 fine are quoted at from 72½ to 74½c. per Troy ounce, depending upon quantity.

Rolled sterling silver 69½c. to 71½c.

NICKEL ANODES

90 to 92% purity	43 c.-45 c. per lb.
95 to 97% purity	45 c.-47 c. per lb.

Supply Prices, August 3, 1925

CHEMICALS

These are manufacturers' quantity prices and based on delivery from New York City.

Acetone	lb.	.14–.16
Acid—		
Boric (Boracic) Crystals	lb.	.12
Hydrochloric (Muriatic) Tech., 20°, Carboys	lb.	02
Hydrochloric, C. P., 20 deg., Carboys	lb.	.06
Hydrofluoric, 30%, bbls	lb.	.08
Nitric, 36 deg., Carboys	lb.	.06
Nitric, 42 deg., Carboys	lb.	.07
Sulphuric, 66 deg., Carboys	lb.	.02
Alcohol—		
Butyl	lb.	.25¼–.28¾
Denatured in bbls	gal.	.60–.62
Alum—		
Lump Barrels	lb.	.04
Powdered, Barrels	lb.	.04½
Aluminum sulphate, commercial tech	lb.	.02⅜
Aluminum chloride solution in carboys	lb.	.06½
Ammonium—		
Sulphate, tech., bbls	lb.	.03¾
Sulphocyanide	lb.	.65
Argols, white, see Cream of Tartar	lb.	.27
Arsenic, white, kegs	lb.	.08
Asphaltum	lb.	.35
Benzol, pure	gal.	.60
Blue Vitriol, see Copper Sulphate.		
Borax Crystals (Sodium Biborate), bbls	lb.	.05½
Calcium Carbonate (Precipitated Chalk)	lb.	.04
Carbon Bisulphide, Drums	lb.	.06
Chrome Green, bbls	lb.	.33
Cobalt Chloride	lb.	—
Copper—		
Acetate	lb.	.37
Carbonate, bbls	lb.	.17
Cyanide	lb.	.50
Sulphate, bbls	lb.	.05¼
Copperas (Iron Sulphate, bbl.)	lb.	.01½
Corrosive Sublimate, see Mercury Bichloride.		
Cream of Tartar Crystals (Potassium bitartrate)	lb.	.27
Crocus	lb.	.15
Dextrin	lb.	.05–.08
Emery Flour	lb.	.06
Flint, powdered	ton	$30.00
Fluor-spar (Calcic fluoride)	ton	$75.00
Fusel Oil	gal.	$4.45
Gold Chloride	oz.	$14.00
Gum—		
Sandarac	lb.	.26
Shellac	lb.	.59–.61
Iron, Sulphate, see Copperas, bbl.	lb.	.01½
Lead Acetate (Sugar of Lead)	lb.	.13
Yellow Oxide (Litharge)	lb.	.12½
Mercury Bichloride (Corrosive Sublimate)	lb.	$1.15
Nickel—		
Carbonate dry, bbls	lb.	.29
Chloride, 100 lb. lots	lb.	.21
Salts, single bbls	lb.	.10½
Salts, double bbl.	lb.	.10
Paraffin	lb.	.05–.06
Phosphorus—Duty free, according to quantity		.35–.40
Potash, Caustic Electrolytic 88-92% fused, drums	lb.	.093
Potassium Bichromate, casks (broken)	lb.	.08¾
Carbonate, 82-92%, casks	lb.	.06¼
Cyanide, 165 lb. cases, 94-96%	lb.	.57½
Pumice, ground, bbls	lb.	.02½
Quartz, powdered	ton	$30.00
Rosin, bbls	lb.	.03
Rouge, nickel, 100 lb. lots	lb.	.25
Silver and Gold	lb.	.65
Sal Ammoniac (Ammonium Chloride) in casks	lb.	.08
Silver Chloride, dry	oz.	.86
Cyanide (Fluctuating Price)	oz.	.70
Nitrate, 100 ounces lots	oz.	.48½
Soda Ash, 58%, bbls	lb.	.02½
Sodium—		
Biborate, see Borax (Powdered), bbls	lb.	.05½
Cyanide, 96 to 98%, 100 lbs	lb.	.22
Hyposulphite, kegs	lb.	.04
Nitrate, tech., bbls	lb.	.04¼
Phosphate, tech., bbls	lb.	.03¾
Silicate (Water Glass), bbls	lb.	.02
Sulpho Cyanide	lb.	.45
Soot, Calcined	lb.	—
Sugar of Lead, see Lead Acetate	lb.	.13
Sulphur (Brimstone), bbls	lb.	.02
Tin Chloride, 100 lb. kegs	lb.	.41
Tripoli, Powdered	lb.	.03
Verdigris, see Copper Acetate	lb.	.37
Water Glass, see Sodium Silicate, bbls	lb.	.02
Wax—		
Bees, white ref. bleached	lb.	.60
Yellow, No. 1	lb.	.45
Whiting, Bolted	lb.	.02½–.06
Zinc, Carbonate, bbls	lb.	.11
Chloride, 600 lb. lots	lb.	.08
Cyanide	lb.	.41
Sulphate, bbls	lb.	.03½

COTTON BUFFS

Open buffs, per 100 sections (nominal),		
12 inch, 20 ply, 64/68, unbleached sheeting	base,	$32.40-$40.85
14 inch, 20 ply, 80/96, " "	base,	45.25- 50.80
12 inch, 20 ply, 80/96, " "	base,	47.35- 46.20
14 inch, 20 ply, 84/92, " "	base,	63.15- 62.25
12 inch, 20 ply, 88/96, " "	base,	..... 63.25
14 inch, 20 ply, 88/96, " "	base,	..... 85.15
12 inch, 20 ply, 80/96, " "	base,	..... 52.70
14 inch, 20 ply, 80/96, " "	base,	..... 70.80
Sewed Buffs, per lb., bleached and unbleached	base,	.55 to .75